PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

Advance Info

Published by ADVANCE SOLVENTS & CHEMICAL CORP.

ECONOMICAL ZIRCONIUM DRIER CATALYST OFFERS DRYING ADVANTAGES

ZIRCONIUM DRIER CATALYST effectively replaces COBALT and other DRIERS in paints and enamels *at reduced costs.*

Widespread Acceptance

Industry-wide acceptance of Advance Zirco Drier Catalyst 6% has confirmed numerous laboratory tests performed by the research chemists of Advance Solvents & Chemical Corporation as to the real value of this ZIRCONIUM complex as a drying aid.

Drier Replacement

While not a drier itself, ZIRCO has a synergistic action on other driers and enhances their activity. By replacing part of such primary drier metals as Cobalt and Manganese with ZIRCO, equal drying time, better through dry, far superior hardness without embrittlement, better color and a reduction in drier adsorption has been obtained.

When used with primary driers, ZIRCO acts as a primary drier itself. Secondary driers on the other hand, such as Lead, can be totally replaced by ZIRCO.

ZIRCO ASSURES BETTER COLOR UNIFORMITY

Better Color Retention

ZIRCO has proven of real importance in force dry finishes where the critical need is for uniformity, especially where various coated parts are baked in different ovens. (Shows least change of color even after rebaking and after spotting.) The advantages resulting from the use of ZIRCO in drier combinations are better gloss, freedom from discoloration (something which is difficult to match with other drying systems), "whiter" white coatings, less tendencies to wrinkling and improved adhesion, flexibility and shock resistance.

Tests recently concluded of white and light colored alkyd baking finish enamels, utilizing ZIRCO-Cobalt combinations in some and ZIRCO-Manganese in others, produced better hardness and less discoloration than the usual Cobalt-Manganese and Lead combinations.

CASE HISTORIES

A. In a white alkyd melamine roller coating enamel, the use of ZIRCO with *Advance Rare Earth Catalysts* and minute amounts of Manganese drier gave improved hardness, whiteness, gloss and flexibility.

B. In an air dry alkyd type enamel where tack free time with a lead drier system could not be obtained overnight, a ZIRCO-Cobalt-Manganese combination in a 7:5:3 ratio gave excellent dust-free time, a much improved tack-free time and excellent overnight hardness.

C. In another case where it was impossible to get a satisfactory dry in 30 hours (in an air dry, long oil alkyd enamel), equal parts of ZIRCO and Advance Hexogen Cobalt have dust-free time of 5-1/2 hours and tack-free time of 22 hours.

While *Advance Soligen* and *Hexogen Rare Earth Catalysts* have always been regarded as superior driers for white baking enamels, the replacement by equal parts with ZIRCO in the Rare Earth formula produced even "whiter" whites.

ZIRCO Results Justify Formula Revisions

These are only a few of the many interesting results produced by the proper use of Advance ZIRCO Drier Catalyst 6%. We urge that ZIRCO be evaluated by all drier users because of its present widespread use and particularly because of its much lower cost over the Cobalt driers it so effectively replaces.

CEMBER
1953

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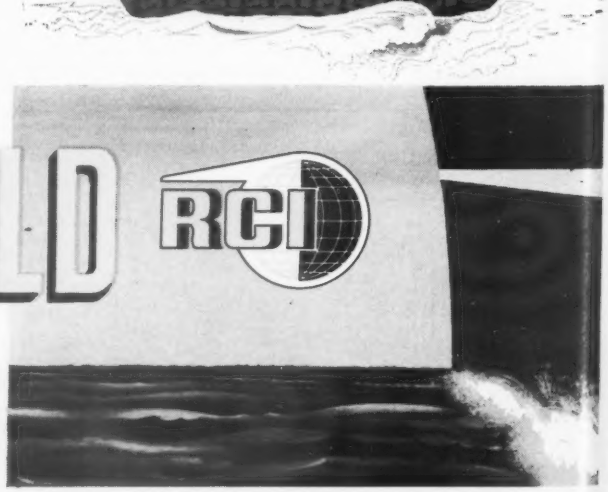

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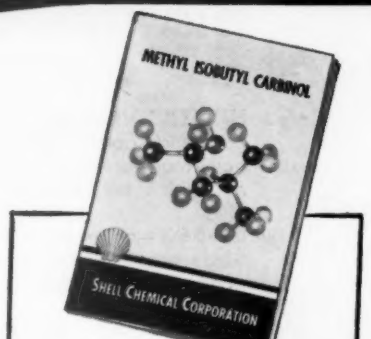

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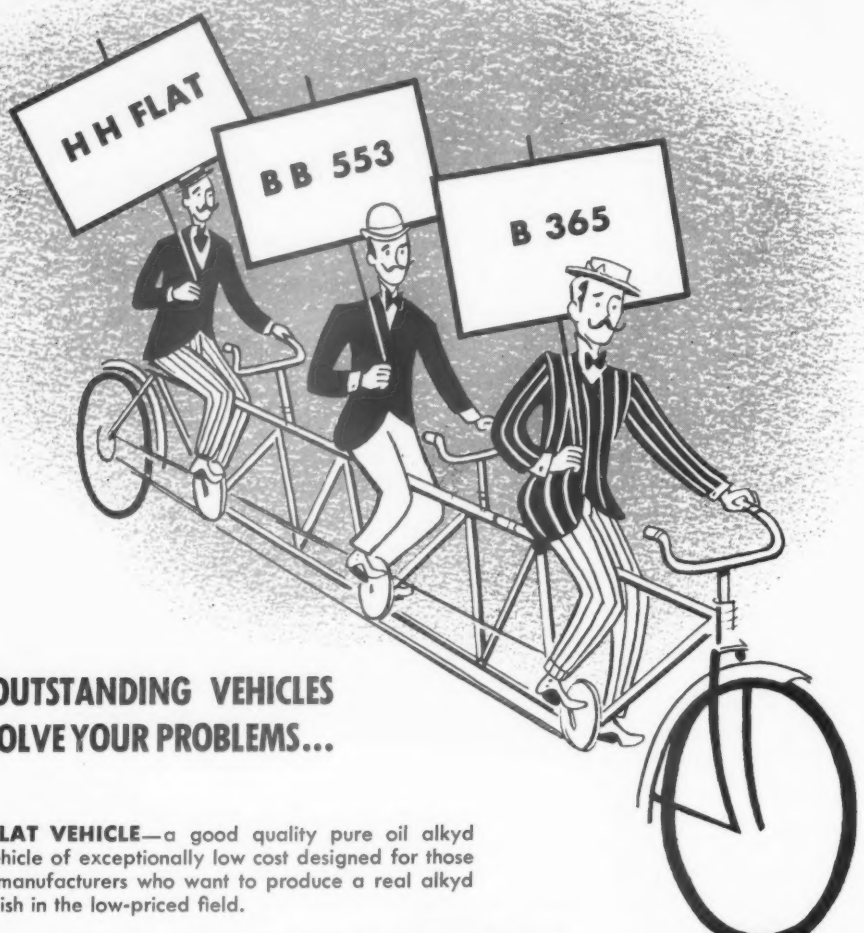

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VOL. 43 DECEMBER, 1953 NO. 12

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and
A Happy New Year

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Editorial Comment

The 1953 Annual Review

AS WE are about to close out another year, it becomes necessary to take stock of the accomplishments and trends during the year in order to plan for the future.

The paint industry, like other fields, has progressed both commercially and technologically during the last twelve months. Keeping abreast of all these developments is virtually an impossible task for the busy executive, sales manager, technical director, chemist, production man, and purchasing agent.

Last year we published the 1952 Annual Review of the Paint Industry in three parts, appearing in the January, February, and March issues respectively. Praise for this work was so overwhelming that it was decided to publish the 1953 Annual Review as a separate volume.

Thus, we take special pride in announcing the publication of the 1953 Annual Review of the Paint Industry.

This work is a one volume digest of the technical and commercial developments in all phases of the paint industry. In addition to a complete summation of United States, British and German patents of potential interest to the paint industry, the individual phases of information published in the technical literature are assembled into as uniform a presentation as possible so that a coordinated picture of the developments in any specific branch of the industry is available.

Specific topics which will be covered in this review include a section on the business picture as it pertains to the paint industry such as paint sales, product development, important trends, etc. The Government picture will also be discussed from the standpoint of the needs of the various agencies in the way of coating materials.

Of particular interest to the technical men of the industry will be a section devoted to the important technological developments which have occurred during this year. Raw materials will be discussed in detail and these include drying oils, fatty acids, waxes, chemical intermediates, resins, pigments, solvents, plasticizers, driers and other paint additives. Developments in paint production techniques, including new equipment will also be treated. Other important phases to be covered are developments in surface preparation, plant maintenance, testing and evaluation, and trends in formulation. New paint technology books and other books of related interest together with courses offered by various universities and colleges, will also be listed.

Considerable progress has been made over the 1952 Annual Review. It is estimated on the information collected to date, that the 1953 Annual Review will be a summation of over 2,000 individual patents and technical articles. In addition, there will be over 500 commercial developments of significance. It is expected that this review will consist of 125,000 words which not only will present an accurate, over-all picture of progress, but its complete index will enable one to find a quick answer to any problem that may arise.

In the previous paragraphs, we have told you about the contents of the review. Now we like to tell you why this work will be a valuable and useful tool to the entire paint industry.

From comments received about last year's review, it appears that the progressive paint companies use this annual summary; a) to keep advised of new technological developments that will result in improved coatings, b) keep informed of new coating needs about which they may not have been aware, c) serve as a check list to insure appropriate consideration has been given to promising ideas, materials, techniques, which have been introduced, d) keep aware of the directions in which competitors are moving, e) keep up-to-date on progressive business and management techniques by which they can wring greater profit from their sales dollar, f) compile a progressive record of market research data, g) and be a source of ideas.

For the alert paint chemist this review will; a) help improve his ability to do his daily job, b) increase his value to his firm, c) enable his company to increase sales and profits, d) and broaden his background and outlook so that he will be prepared to handle greater responsibilities.

It is without any question that the 1953 ANNUAL REVIEW OF THE PAINT INDUSTRY deserves an important place on your bookshelf as it will be the most comprehensive review of its kind, designed to put at your finger tips all salient and relevant data (both commercial and technical), facts and figures on the coatings industry. Publication date has been set for February 15, 1954.

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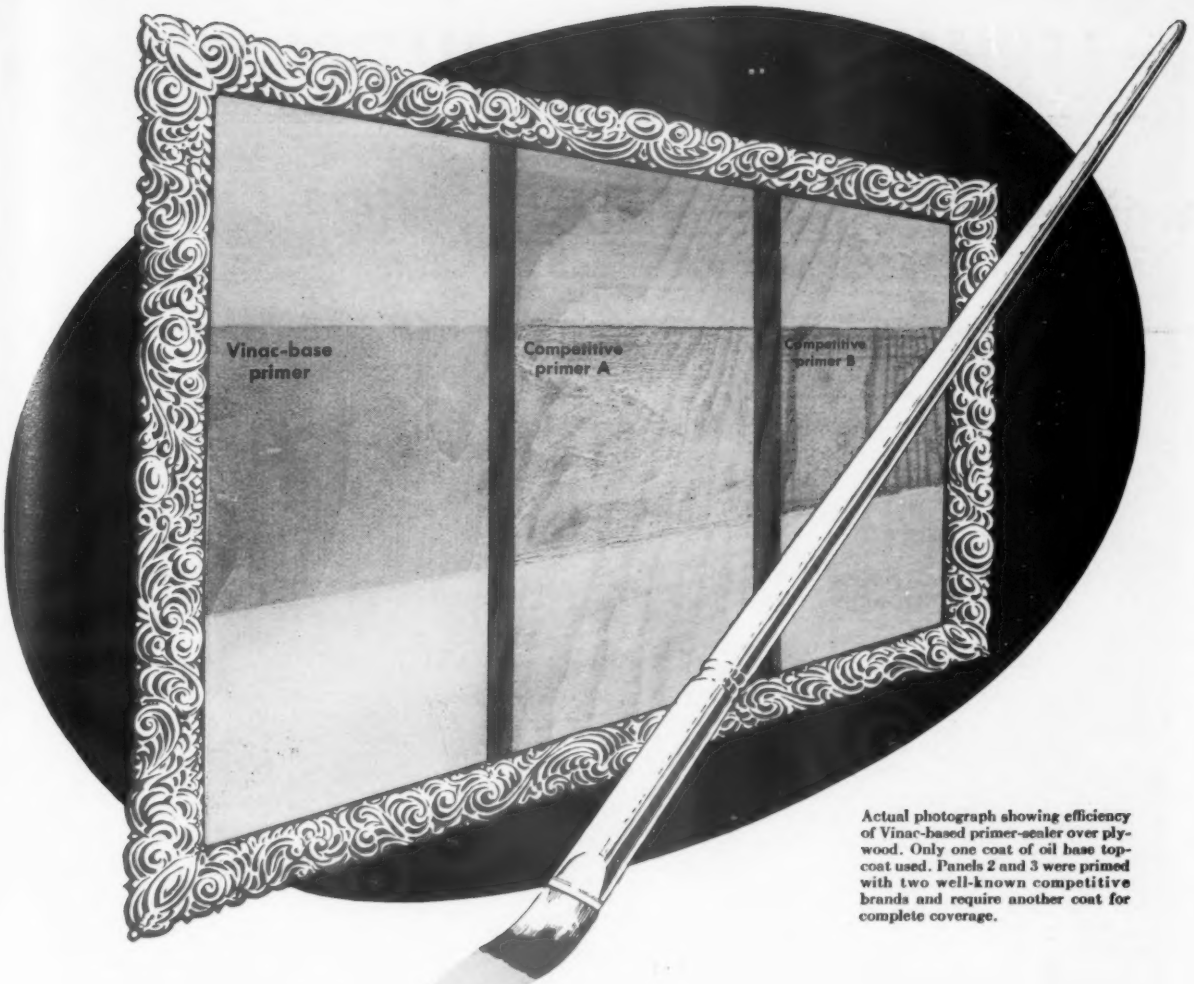

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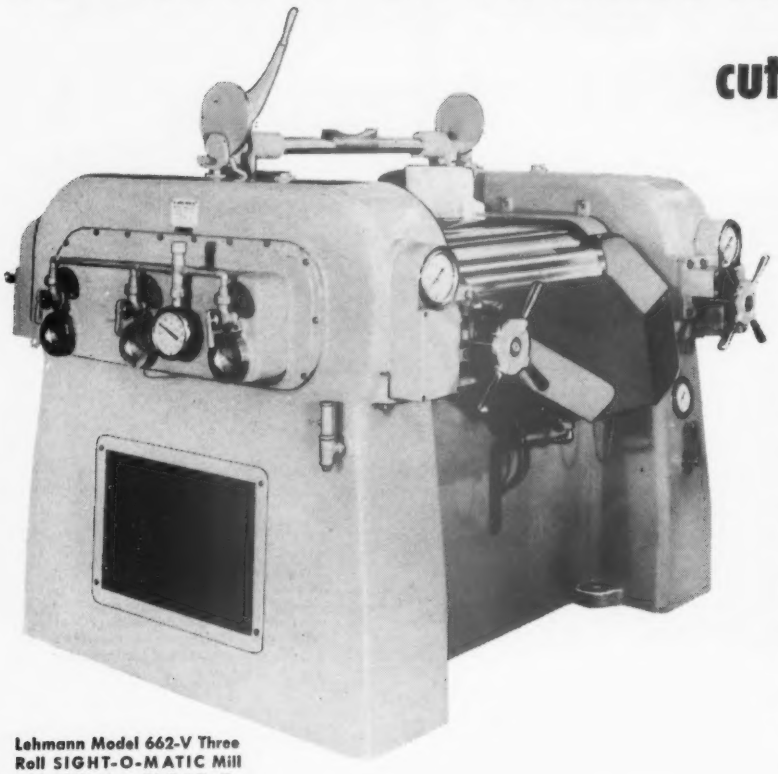

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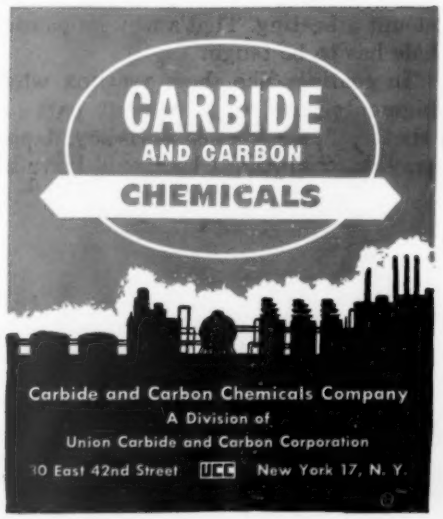

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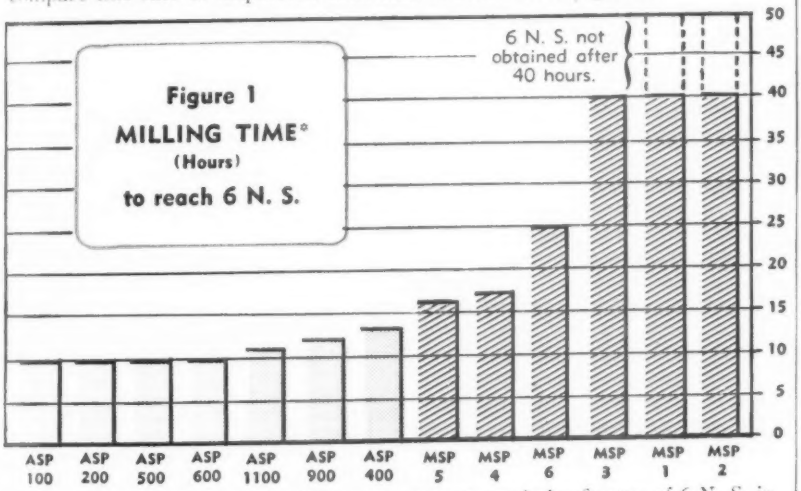
ALUMINUM SILICATE PIGMENTS

PUBLISHED BY EDGAR BROTHERS COMPANY — METUCHEN, NEW JERSEY

MILLING TIME GREATLY REDUCED THROUGH USE OF EDGAR ASPs

READY DISPERSIBILITY INCREASES EFFICIENCY — SHORTENS MILLING TIME

One of the most difficult formulations* to grind was selected to establish quantitative data on the degree of dispersibility of Edgar ASPs . . . and to compare this rate of dispersion with that of other inert pigments.



The comparative results on the dispersibility of Edgar ASPs and magnesium silicates (the inerts tested), employing the specification grinding formula, are presented in the accompanying Figure 1. Note that fineness (North Standard Units) is plotted against time in hours. From Figure 1 it can be seen that the slowest ASPs to disperse, ASP 400 and 900, reach a fineness of 6 N. S. more rapidly than even the fastest grinding magnesium silicate tested.

A noteworthy point illustrated by Figure 1 is the small difference in dispersibility between the various Edgar ASPs. ASP 100 and ASP 200, the fine fractionated Aluminum Silicates, reached a fineness of 6 N. S. in 9 to 10 hours each. ASP 400 required approximately 13 hours to reach a 6 fineness. This difference between the end members in the Edgar ASP series amounts to only 4 hours. The rate for ASP 500 and ASP 600, the intermediate fractionated ASPs, was almost the same as that for the fine fractionated ASPs, being about 10 hours. The unfractionated ASP 900 required 12 hours. Edgar ASP 1100, a fine fractionated product coated with 0.5% stearate, reached a fineness of 6 N. S. in about 11 hours.

From this study it can be concluded that Edgar ASPs disperse much more readily and, hence, give good final products.

Figure 2 shows the comparative units ground per hour by both the Daniel Flow Point method and the Specification Grinding formula.

From this it can be seen that when the Flow Point method is followed, the time of dispersion is greatly reduced and comparative units ground per hour much higher. A comparison of results between the two grinding formulas shows, however, that the comparative ease of dispersion of Edgar ASPs over the other inerts tested remains about the same—regardless of whether a grinding formula of high or low efficiency is used.

In high solids formulas such as those established by the Flow Point method inter-particle shear undoubtedly is one of the major forces contributing to dispersion. In roll mill operation this shearing force is, of course, considerably greater. The Edgar ASPs used in this study, because of their fineness, plate-like particle shape and softness, are particularly suited for roll mill formulations.

It can be further concluded, therefore, that this proven time saving in the mill grinding of Edgar ASPs leads directly to increased mill efficiency and production. Logically, with an appreciable reduction in grinding time, more units can be ground when Edgar ASPs are used.

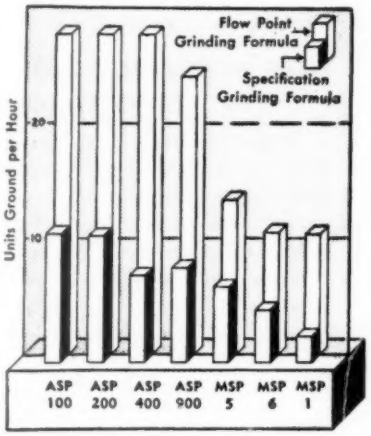


Figure 2. Comparison units ground per hour by Daniel Flow Point method and Specification Grinding formula.

EASY TO TEST

It is easy to test the qualities of Edgar ASPs right in your own formulas. All you need do is use this coupon to order your free sample drum of the ASP best suited to your requirements.

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Please send me the following:
File Folder with Technical Literature. 5 lb. sample drum of . . .

ASP 100 ☐ ASP 200 ☐ ASP 400 ☐ ASP 500 ☐ ASP 600 ☐ ASP 900 ☐ ASP 1100 ☐

Name_____ Title_____

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*HL-P-6889-A . . . Complete report published Vol. 43 January, 1953 No. 1. Paint and Varnish Production.

NEW PROTECTIVE COATING CHEMICAL FOR ALUMINUM

ALODIZING

Alodizing with "Alodine,"* a new technique in the protective coating of aluminum, was made available for production-scale use in 1946. Since that time Alodizing has largely supplanted the more elaborate, costly and time-consuming anodic treatments in the aircraft and other industries.

Continuous and successful industrial use has clearly demonstrated the simplicity and economy of the Alodizing process as well as the effectiveness of the "Alodine" amorphous coatings, particularly as a base for paint. In fact, the paint-bond that Alodized aluminum provides has been found to be superior to that possible with chromic acid anodizing.

The corrosion-resistance of unpainted aluminum Alodized with "Alodine" Nos. 100 or 300 is excellent, easily meeting the requirements of Specification MIL-C-5541. However, a need for protection of unpainted aluminum, even better than that obtained with chromic acid anodizing, has long been recognized.

NEW IMPROVED "ALODINE" DEVELOPED By ACP RESEARCH CHEMISTS

Several years of intensive research have now led to a new type of "Alodine," designated as "Alodine" No. 1200. This new protective coating chemical forms an amorphous mixed metallic oxide coating of low dielectric resistance that provides unusually high corrosion-resistance for unpainted aluminum. In addition, it forms an excellent paint bond that approaches closely the high quality obtained with the earlier types of "Alodine."

After having been tested for conformance with Specification MIL-C-5541, "Alodine" No. 1200 is now about to go into production.

PROCESS DETAILS

"Alodine" No. 1200 is the only essential chemical needed to prepare the coating bath and the final rinse bath. One of its unique features is that it can be used in tanks in an immersion process, or, in a multi-stage power washer in a spray process, or, with a slight adjustment of pH, with brush or portable spray equipment in a manual process. This means that even where the simple production equipment is not available, or where touching up of damaged coatings previously Alodized or anodized is required, excellent protection and paint bonding can still be obtained with practically no equipment.

All three methods of application easily meet the requirements of Specification MIL-C-5541.

Process sequence for all three methods of application is the same as for other standard grades of "Alodine" such as Nos. 100, 300, and 600, viz.: 1. Pre-cleaning. 2. Rinsing. 3. Alodizing. 4. Rinsing. 5. Acidulated rinsing. 6. Drying.

Coating time in an immersion process ranges from 2 to 8 minutes and in a mechanized spray process is about 30 seconds. "Alodine" No. 1200 baths are operated at room temperatures (70° to 100°F.) and heating is required only if the bath has gotten cold after a "down" period.

RECOMMENDED USES FOR "ALODINE" No. 1200

"Alodine" No. 1200 is specifically recommended for coating wrought products that are not to be painted or are to be only partially painted; and for coating casting and forging alloys whether or not these are to be painted. "Alodine" Nos. 100 and 300 are still recommended for coating wrought products such as venetian blind slats, awnings, etc., that are invariably painted.

RESULTS OF TENSILE TESTS

This new "Alodine" not only retards visible corrosion and pitting, but as shown in the table below, the loss of ductility with "Alodine" No. 1200, both brush and dip, after 1000 hours salt spray was less than for chromic acid anodizing after 250 hours, and for "Alodine" No. 100 and a conventional chromate treatment after 168 hours exposure.

PROCESS	SALT SPRAY EXPOSURE	COMPLIANCE WITH TENSILE REQUIREMENTS OF MIL-C-5541
CHROMIC ACID ANODIZING	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	fails
	1000 hrs.	fails
BRUSH "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 100	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails
CONVENTIONAL CHROMATE TREATMENT	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails

*"Alodine" Trade Mark Reg. U. S. Pat. Off.

CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY

General Offices: **Ambler, Penna.**

Detroit, Michigan — *Niles, California* — *Windsor, Ontario*

Solubility Factor In Metal Phosphate Pre-treatments

● ● ● *Method Measures Chemical Conversion During Pre-Treatments and Effect on Paint Bonding*

By DR. MAX KRONSTEIN
PHILIP HIXON
JACK GRANOWITZ

College of Engineering
New York University

This paper is concerned with the study of metal-phosphate coatings on steel as a base for paint application.

It is, in particular, concerned with the problem of comparing the amount of insoluble phosphate coating matter which is produced during application from a water solution of the initial material and also with a study of the effect of not converted and still water soluble material present in the phosphate coating on subsequent paint applications.

For this purpose a method is being presented for comparing the content of still-soluble matter in phosphate-coated panels. Further on, parts of the soluble remnants are being removed and paint panel tests are being reported based on the same pre-treatment before and in the course of the removal of the soluble rennants of the initial compound.

THE main aim of the use of phosphate coatings on steel before paint application is to increase the bonding characteristics between the paint system and the steel.

This research group presented detailed studies in this respect at the Fall Meeting, 1952, of the Paint, Varnish and Plastics Division of the A.C.S. in Atlantic City.[1] At that time two zinc phosphate materials and two iron phosphate materials were studied, using as test methods the profile determination with the surface analyzer, the stripping weight determination and the application of two different types of organic coatings with subsequent exposure and electrographic printing tests.[2] At that time the problem of the water solubility of the phosphate coatings was approached as a point of importance. The present paper is the result of studies to clarify this question by experimental developments.

Part I-Study of Water-Soluble Matter in the Phosphate Coating

Phosphate coatings are expected to delay the rate formation of water-soluble substance in the practice of corrosion protection of steel surfaces. It is not to be expected that the thin phosphate coating alone will permanently eliminate the formation of water-soluble corrosion substance. Therefore, any method of studying the amount of water-soluble matter in a phosphate coating must take into account two different possible soluble products. These are a) the still soluble remnants of the chemicals used in the application of the phosphate coating, considering also soluble remnants from the subsequent chromic rinse, and b) the newly formed water-soluble iron matter as a state of the beginning of corrosion of this surface.

When testing newly prepared panels, the second factor is expected to be of minor importance; but it is still desirable to study methods for differentiating between the two classes of soluble matter. This paper, therefore, will present studies in this connection also.

The method of studying the relative amounts of water-soluble matter in a series of different type treatments is based (in this work) on the effect of such matter on a known quantity of distilled water in which the test panel is being immersed. The electrical resistance of the test water—for instance, 2000 cc distilled water at 25°C.—is measured. It might vary somewhat between different test set-ups, such as the condition of the water itself; but for the subsequent immersion tests this initial resistance represents the 100% resistance value for this test.

When a test panel is immersed in this water under test conditions which are kept constant for all comparative determinations, the resistance decreases with the addition of water-soluble matter which is being dissolved from the metal surface during measured time intervals.

Figure 1 shows the test set-up, using a platinum dip-type conductivity cell having a cell constant of 0.1 ($\pm$0.002) which is immersed in the beaker with

[1] This paper was presented at the Division of Paint, Plastics, and Printing Ink Chemistry, American Chemical Society Meeting, Sept. 7, 1953, Chicago, Ill.

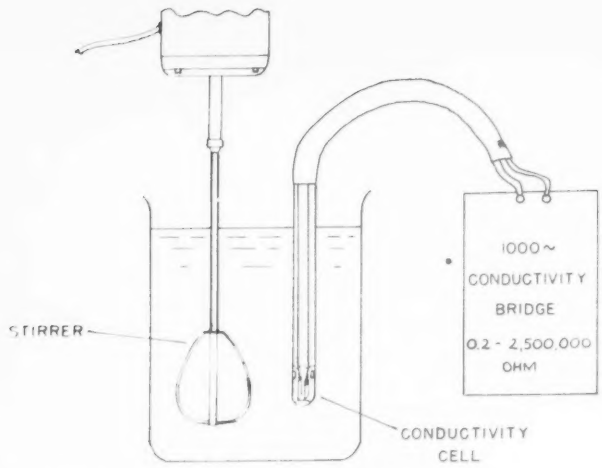


Figure 1. Diagram of setup for conductivity measurements.

the test water. The water is constantly stirred with a mechanical mixer, set at such a speed as to avoid turbulance or to limit, during the short test period, the absorption of additional oxygen or carbon dioxide in the water which would change the resistance. The resistance in the water is measured with a conductivity bridge having a range from 0.2 to 2,500,000 Ohms measured resistance with 50-60 and 1000 cycle bridge source frequencies.

It was found that upon immersing the panels with the various pretreatments the greatest drop occurs within the first 30-60 seconds after which time there is a period of lesser drop in resistance.

The curves in Figure 2 have been calculated, from the instrument readings, in the manner given in Table I. This means that the readings have been compared to the initial water resistance as 100%. They, therefore, are calculated to show the drop of that resistance in percent of the initial resistance.

Since the four phosphate treatments used in this curve have different stripping weights, they represent different amounts of phosphate coating matter. And it was indeed expected that different amounts of such matter would possibly contain different amounts of the not-converted substance also. To permit a com-

Table 1

Immersion of Phosphate Treated Panels of Different Stripping Weights in Distilled Water
Calculation of Comparative Resistivity

Measured resistivity, expressed in percent of that for distilled water, multiplied by a correction factor:
Reference Stripping Weight (75 mg./sq. ft).
Experimental Stripping Weight.

Treatment	Stripping Weight	Correction Factor	Time of Immersion	Measured Resistivity	Calculation of the Correction (Loss x Factor = Correction)	Corrected Percent Resistivity
			0	100%	0 x 1.10 = 0	100%
A.	68 mg. sq. ft.	1.10	1:05 min.	97.5	2.5 x 1.10 = 2.75	97.25
			2:08	95.5	4.5 x 1.10 = 4.95	95.05
(Iron Phosphate I.)			3:10	94.9	5.1 x 1.10 = 5.60	94.40
			4:10	93.5	6.5 x 1.10 = 7.15	92.85
			5:12	92.1	7.9 x 1.10 = 8.70	91.30
			6:10	90.0	10.0 x 1.10 = 11.00	89.00
			0	100%	0 x 0.51 = 0	100%
B.	147 mg. sq. ft.	0.51	0:10 min.	92.5	7.5 x 0.51 = 3.82	96.18
(Zinc phosphate I.)			0:36	91.0	9.0 x 0.51 = 4.60	95.40
			1:06	89.0	11.0 x 0.51 = 5.60	94.40
			2:12	86.8	13.2 x 0.51 = 6.73	93.27
			4:07	86.8	13.2 x 0.51 = 6.73	93.27
			6:12	85.4	14.6 x 0.51 = 7.46	92.55
			0	100%	0 x 0.47 = 0	100%
C.	160 mg./sq. ft.	0.47	0:10 min.	76.8	23.2 x 0.47 = 10.90	89.10
(Zinc Phosphate II.)			0:18	64.9	35.1 x 0.47 = 16.50	83.50
			0:28	51.5	48.5 x 0.47 = 22.60	77.40
			0:41	43.7	56.3 x 0.47 = 26.46	73.54
			0:56	33.2	66.8 x 0.47 = 31.40	68.60
			1:38	30.4	69.6 x 0.47 = 32.70	67.30
			2:08	29.9	70.1 x 0.47 = 32.95	67.05
			3:51	29.4	70.6 x 0.47 = 33.18	66.82
			5:57	29.1	70.9 x 0.47 = 33.32	66.68
			0	100%	0 x 2.206 = 0	100%
D.	34 mg. sq. ft.	2.206	0:14 min.	78.0	22.0 x 2.206 = 48.53	51.47
(Iron Phosphate II.)			1:07	73.5	26.5 x 2.206 = 58.46	41.54
			2:14	73.0	27.0 x 2.206 = 59.56	40.44
			3:00	72.5	27.5 x 2.206 = 60.67	39.33
			3:50	72.0	28.0 x 2.206 = 61.77	38.23
			5:51	71.5	28.5 x 2.206 = 62.87	37.13

rison, all were correlated to an assumed standard ating weight. In this case a value of 75 mg/sq. ft. s chosen. To introduce this comparative factor the calculation of the curves for the resistivity per ne interval, the following equations were used:

$$\text{Measured Loss in Resistivity(\%)} \times \frac{\text{Refrence Stripping Wt.}}{\text{Experimental Stripping Wt.}} = \text{Corrected Loss(\%)}$$

$$\text{Corrected Resistivity(\%)} = 100\% - \text{Corrected Loss (\%)}$$

The results for the four metal-phosphate treatments are shown in Table I. That these curves are typical for these metal-phosphate treatments is shown by comparing them with the curve obtained from immersing a carefully cleaned automotive steel panel instead (Figure 3) or from comparing the effect of immersing a steel panel which has been surface treated by exposing it for 2 minutes in hot, 85% phosphoric acid and dipping it afterward for 1 or 2 minutes in distilled water (Figure 4). In the first case, the sudden drop which occurs in the chemically treated surfaces is hardly visible and the formation of soluble matter proceeds as shown in Figure 3. In the second case, the reaction product of the phosphoric acid with the steel is so much more water soluble than the phosphate coatings that an extreme drop occurs in the first few seconds of the immersion, as shown in Figure 4.

Table 2

Comparing the Stripping Weights on Four Types of Phosphate Treated Steel Panels Before and After the 24-hr. Immersion Test with oven drying at 105°C.

	Stripping Weights	
	Before Immersion	**After immersion and Oven Drying**
Plain Steel	0 mg/sq. ft.	117.2 mg/sq. ft.
Iron Phosphate I	68.0	100.9
Zinc Phosphate I	147.0	314.0
Zinc Phosphate II (Dip-Coat)	109.0	120.5
Iron Phosphate II	34.0	277.0

The fact that all curves obtained from the metal-phosphate treated panels showed the same kind of leveling off after the first minutes of immersion of the panels made it desirable to determine the length of time during which these treatments, without paint coatings, under water immersion, would prevent the formation of water soluble iron products or delay the beginning of corrosion.

For that purpose parallel tests were carried out over a 24-hour period of water immersion. In these tests (Figure, 5) the curves showed an additional drop in resistance which increased in intensity as the corrosion progressed.

That rust had been formed on all four types of phosphate treated panels during this 24-hour immersion test and the subsequent drying of the panels in an oven at 105°C. is shown in Table 2. Here new stripping weights were determined and were compared with the initial stripping weights. It is in-

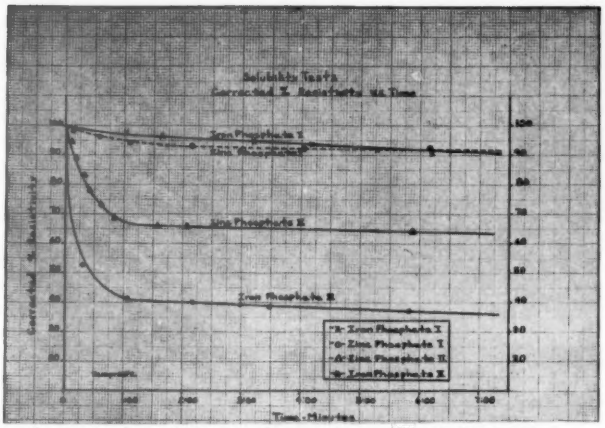


Figure 2. Solubility tests: Corrected percent resistivity vs. time

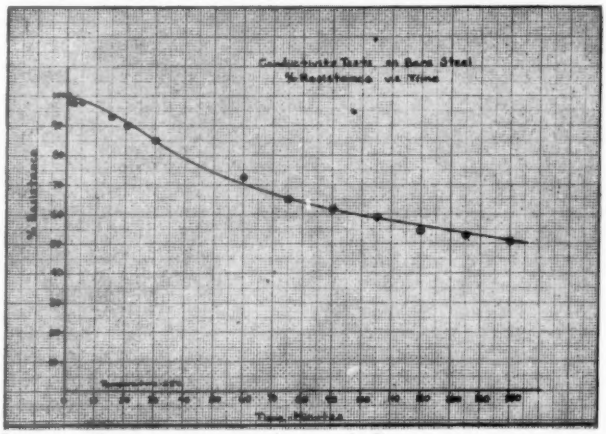


Figure 3. Conductivity tests on bare steel: Percent resistivity vs. time

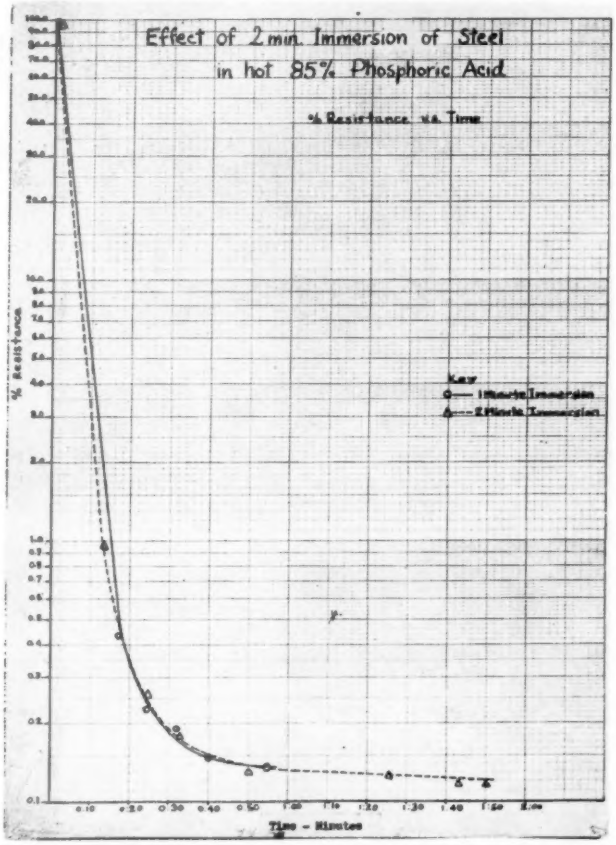


Figure 4. Effect of 2 min. immersion of steel in hot phosphoric acid: Percent resistance vs. time

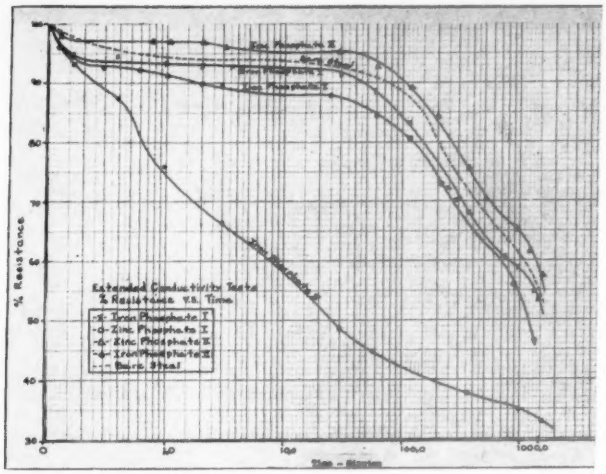


Figure 5. Extended conductivity tests: percent resistance vs. time.

teresting to note that these data differ considerably for the various treatments in a similar sequence as appeared in their resistance drop curves.

This indicates that all of the four phosphate coatings tested did not give continuous protection without additional paint application and that their period of initial corrosion inhibitance before paint coating also differs.

In this respect Table 3 shows that panels having the same pre-treatment differ in thier resistance drop when tested immediately after their preparation and when tested after they had been exposed to humid air for more than 100 hours. This difference showed up also in respect to the types of phosphate treatment which were tested.

Soluble Chemical Remnants and Corrosion Material

A method of differentiating between the chemical remnants of the pre-treatment in a water solution and the corrosion matter of the steel itself was based on a method for the determination of dissolved phosphate matter in a water solution as suggested by Preston, Settle and Worthington[3] recently.

Their method is based on the colorimetric comparison of a test solution with a standard solution of 5.582 grams anhydrous potassium dihydrogen phosphate in 250 ml. water, after diluting 10 ml. of this solution with 1000 ml. additional water. Compared with this reading is a second one based on the water solutions under test for their phosphate content. To each test solution of 60 ml., 5 ml. hydrochloric acid were added and were neutralized with a sodium hydroxide solution (100 g. NaOH in 250 g. water), 5 ml. of a 12 N sulfuric acid were added, and 8 ml. of a 5% ammonium molybdate solution in a 5 N sulfuric acid, and 4 ml. of a solution of 20 g. sodium

Table 3

Comparing the resistance changes for immersion of freshly prepared Phosphate treated panels and for panels suspended over water for more than 100 hrs.

Iron Phosphate I

Freshly Prepared Dried 1 hr at 110°C.			Suspended Over Water For 168 Hours		
Time	Resistance	%	Time	Resistance	%
0 min. 0 sec.	70000 Ohm	100%	0 min. 0 sec.	67000 Ohm	100%
0 min. 30 sec.	59000	84.2	0 min. 30 sec.	26500	39.6
1 min. 0 sec.	59000	84.2	1 min. 0 sec.	22000	32.8
1 min. 30 sec.	59000	84.2	1 min. 30 sec.	20000	29.8
2 min. 0 sec.	59000	84.2	2 min. 0 sec.	19500	29.1

Zinc Phosphate II (Dipcoated)

Time	Resistance	%	Time	Resistance	%
0 min. 0 sec.	57000 Ohm	100%	0 min. 0 sec.	68000 Ohm	100%
0 min. 30 sec.	48000	84.2	0 min. 30 sec.	27000	39.7
1 min. 0 sec.	48000	84.2	1 min. 0 sec.	26000	38.2
1 min. 30 sec.	48000	84.2	1 min. 30 sec.	25000	36.7
2 min. 0 sec.	48000	84.2	2 min. 0 sec.	24000	35.2

Iron Phosphate II

			Over Water For 120 Hours		
Time	Resistance	%	Time	Resistance	%
0 min. 0 sec.	54000 Ohm	100%	0 min. 0 sec.	53000 Ohm	100%
0 min. 30 sec.	50000	92.6	0 min. 15 sec.	10000	19.0
1 min. 0 sec.	50000	92.6	0 min. 30 sec.	5300	10.0
1 min. 30 sec.	49000	91.0	0 min. 45 sec.	5100	9.6
2 min. 0 sec.	49000	91.0	1 min. 0 sec.	5100	9.6
			1 min. 30 sec.	4900	9.2
			2 min. 0 sec.	4900	9.2

Table 4

Comparative results for the solutions obtained from the phosphate treated panels in the 24-hour immersion test.

Using a Beckman Spectrophotometer, Model B, at setting No. 2, using a wavelength of 800 millimicrons. Slitwidth selected to give 100% transmission for distilled water (for these tests, between 0.17 and 0.19 mm).

Material*	Percent Transmission	Loss in Transmission		Stripping Wt. Factor**	Corrected Loss	Corrected % Transmission
Distilled water.	100%	—		—	—	100%
British Color Standard (5.582 grams potassium dihydrogen phosphate in 25000 ml. water.)	0.3%	—		—	—	0.3%
Iron Phosphate I	92.0%	8%	×	$\frac{75 \text{ mg.}}{68 \text{ mg.}}$	8.8%	91.2%
Zinc Phosphate I	83.0%	17%	×	$\frac{75 \text{ mg.}}{147 \text{ mg.}}$	8.67%	91.3%
Zinc Phosphate II (Dipcoated)	89.0%	11%	×	$\frac{75 \text{ mg.}}{109 \text{ mg.}}$	7.56%	92.4%
Iron Phosphate II	90%	10%	×	$\frac{75 \text{ mg.}}{34 \text{ mg.}}$	22.0%	78.0%

*Water immersion solutions of the various pre-treated panels were tested as follows:
60 ml. of each solution was mixed successively with the addition of 5 ml. of a 12 N sulfuric acid and 8 ml. of a 5% ammonium molybdate solution in a 5 N sulfuric acid and 4 ml. of a 20% solution of sodium sulfite hydrate in distilled water and finally 4 ml. of a 50% solution of hydroquinone in water. The samples are heated in a 60°C. water bath for 30 min. and allowed to cool over night.
**Since the stripping weight value affects the correction factor considerably, it should be determined for each lot of test panels.

sulfite hydrate in 100 ml. water. Finally, 4 ml. hydroquinone were added. The additions were made in this sequence and the flask was shaken after each addition.

The flasks containing the standard solution and the test solution are then heated on a water bath at 60°C. for 30 min. and then allowed to cool to room temperature.

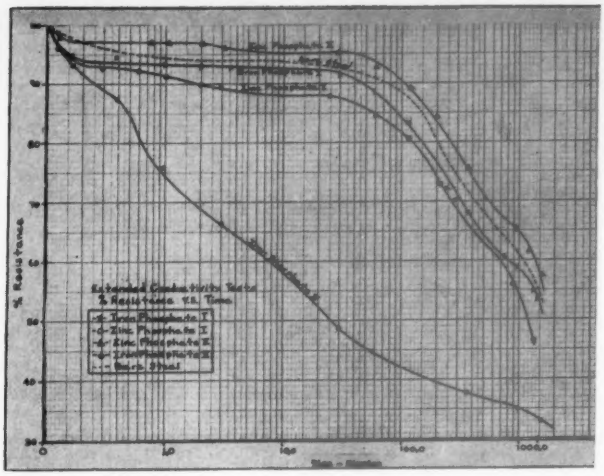
The 5% ammonium molybdate solution is prepared by dissolving 5 grams ammonium molybdate in 30 ml. distilled water and adding this to 50 ml. of a 10 N sulfuric acid and finally diluting the resulting solution with 200 ml. of water.

The sodium sulfite solution has to be prepared fresh each day. The British authors used for their comparisons a colorimeter or Nessler tubes.

In the present work distilled water was used as reference standard. The color measurements were substituted by transmission readings, using a Beckman Spectrophotometer. Readings can be made at different wavelengths. Generally, the sensitivity setting #2 and a wavelength of 800 millimocrons were used in the work, thus permitting a more specific differentiation of the various shades of blue which occur with varying phosphate content. Experiments were made first with a wavelength of 400 or 600 millimicrons which gave less differentiation of the blue colored phosphate material and the yellow caused by the other components. The slitwidth was so selected as to give, for the distilled water in a standard Beckman container having a passwidth of 1 cm, a 100% transmittance. This was usually a slitwidth of 0.18 millimeters.

Considering the transmission of water as being 100%, that of the standard phosphate solution as being 0.3%, the decrease of transmission between one sample and another is an expression for the increase in the phosphate content in the solutions. In order to compare those data obtained from the immersion-treated panels having different stripping weights, the data of transmission obtained from the various solutions were again multiplied with the factor: reference stripping weight (75 mg/sq. ft.) divided by the experimental stripping weight. The comparative results for the immersion of the various phosphate coated panels during the described 24-hr. immersion test are given in Table 4.

If phosphate coated panels are tested within a short time after their preparation, such as after 1 hr. drying time, the water solution contains primarily the soluble chemicals retained from the pre-treatment; and the color test gives as expression of this content supplementing the loss of resistance which was determined in the immersion test. If the same kind of panels are first exposed to a corrosive surrounding, such as 95%-100% humidity for 100 hrs., the loss in resistance will be considerably greater; but still it will not cause a different color change at the same time. Some results are given in Table 5.



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teresting to note that these data differ considerably for the various treatments in a similar sequence as appeared in their resistance drop curves.

This indicates that all of the four phosphate coatings tested did not give continuous protection without additional paint application and that their period of initial corrosion inhibitance before paint coating also differs.

In this respect Table 3 shows that panels having the same pre-treatment differ in thier resistance drop when tested immediately after their preparation and when tested after they had been exposed to humid air for more than 100 hours. This difference showed up also in respect to the types of phosphate treatment which were tested.

Soluble Chemical Remnants and Corrosion Material

A method of differentiating between the chemical remnants of the pre-treatment in a water solution and the corrosion matter of the steel itself was based on a method for the determination of dissolved phosphate matter in a water solution as suggested by Preston, Settle and Worthington[3] recently.

Their method is based on the colorimetric comparison of a test solution with a standard solution of 5.582 grams anhydrous potassium dihydrogen phosphate in 250 ml. water, after diluting 10 ml. of this solution with 1000 ml. additional water. Compared with this reading is a second one based on the water solutions under test for their phosphate content. To each test solution of 60 ml., 5 ml. hydrochloric acid were added and were neutralized with a sodium hydroxide solution (100 g. NaOH in 250 g. water), 5 ml. of a 12 N sulfuric acid were added, and 8 ml. of a 5% ammonium molybdate solution in a 5 N sulfuric acid, and 4 ml. of a solution of 20 g. sodium

Table 3

Comparing the resistance changes for immersion of freshly prepared Phosphate treated panels and for panels suspended over water for more than 100 hrs.

Iron Phosphate I

Freshly Prepared Dried 1 hr at 110°C.			Suspended Over Water For 168 Hours		
Time	Resistance	%	Time	Resistance	%
0 min. 0 sec.	70000 Ohm	100%	0 min. 0 sec.	67000 Ohm	100%
0 min. 30 sec.	59000	84.2	0 min. 30 sec.	26500	39.6
1 min. 0 sec.	59000	84.2	1 min. 0 sec.	22000	32.8
1 min. 30 sec.	59000	84.2	1 min. 30 sec.	20000	29.8
2 min. 0 sec.	59000	84.2	2 min. 0 sec.	19500	29.1

Zinc Phosphate II (Dipcoated)

Time	Resistance	%	Time	Resistance	%
0 min. 0 sec.	57000 Ohm	100%	0 min. 0 sec.	68000 Ohm	100%
0 min. 30 sec.	48000	84.2	0 min. 30 sec.	27000	39.7
1 min. 0 sec.	48000	84.2	1 min. 0 sec.	26000	38.2
1 min. 30 sec.	48000	84.2	1 min. 30 sec.	25000	36.7
2 min. 0 sec.	48000	84.2	2 min. 0 sec.	24000	35.2

Iron Phosphate II

			Over Water For 120 Hours		
Time	Resistance	%	Time	Resistance	%
0 min. 0 sec.	54000 Ohm	100%	0 min. 0 sec.	53000 Ohm	100%
0 min. 30 sec.	50000	92.6	0 min. 15 sec.	10000	19.0
1 min. 0 sec.	50000	92.6	0 min. 30 sec.	5300	10.0
1 min. 30 sec.	49000	91.0	0 min. 45 sec.	5100	9.6
2 min. 0 sec.	49000	91.0	1 min. 0 sec.	5100	9.6
			1 min. 30 sec.	4900	9.2
			2 min. 0 sec.	4900	9.2

Table 4

Comparative results for the solutions obtained from the phosphate treated panels in the 24-hour immersion test.

Using a Beckman Spectrophotometer, Model B, at setting No. 2, using a wavelength of 800 millimicrons. Slitwidth selected to give 100% transmission for distilled water (for these tests, between 0.17 and 0.19 mm).

Material*	Percent Transmission	Loss in Transmission		Stripping Wt. Factor**	Corrected Loss	Corrected % Transmission
Distilled water.	100%	—		—	—	100%
British Color Standard (5.582 grams potassium dihydrogen phosphate in 25000 ml. water.)	0.3%	—		—	—	0.3%
Iron Phosphate I	92.0%	8%	×	$\frac{75 \text{ mg.}}{68 \text{ mg.}}$	8.8%	91.2%
Zinc Phosphate I	83.0%	17%	×	$\frac{75 \text{ mg.}}{147 \text{ mg.}}$	8.67%	91.3%
Zinc Phosphate II (Dipcoated)	89.0%	11%	×	$\frac{75 \text{ mg.}}{109 \text{ mg.}}$	7.56%	92.4%
Iron Phosphate II	90%	10%	×	$\frac{75 \text{ mg.}}{34 \text{ mg.}}$	22.0%	78.0%

*Water immersion solutions of the various pre-treated panels were tested as follows:
60 ml. of each solution was mixed successively with the addition of 5 ml. of a 12 N sulfuric acid and 8 ml. of a 5% ammonium molybdate solution in a 5 N sulfuric acid and 4 ml. of a 20% solution of sodium sulfite hydrate in distilled water and finally 4 ml. of a 50% solution of hydroquinone in water. The samples are heated in a 60°C. water bath for 30 min. and allowed to cool over night.
**Since the stripping weight value affects the correction factor considerably, it should be determined for each lot of test panels.

sulfite hydrate in 100 ml. water. Finally, 4 ml. hydroquinone were added. The additions were made in this sequence and the flask was shaken after each addition.

The flasks containing the standard solution and the test solution are then heated on a water bath at 60°C. for 30 min. and then allowed to cool to room temperature.

The 5% ammonium molybdate solution is prepared by dissolving 5 grams ammonium molybdate in 30 ml. distilled water and adding this to 50 ml. of a 10 N sulfuric acid and finally diluting the resulting solution with 200 ml. of water.

The sodium sulfite solution has to be prepared freshly each day. The British authors used for their comparisons a colorimeter or Nessler tubes.

In the present work distilled water was used as reference standard. The color measurements were substituted by transmission readings, using a Beckman Spectrophotometer. Readings can be made at different wavelengths. Generally, the sensitivity setting #2 and a wavelength of 800 millimocrons were used in the work, thus permitting a more specific differentiation of the various shades of blue which occur with varying phosphate content. Experiments were made first with a wavelength of 400 or 600 millimicrons which gave less differentiation of the blue colored phosphate material and the yellow caused by the other components. The slitwidth was so selected as to give, for the distilled water in a standard Beckman container having a passwidth of 1 cm, a 100% transmittance. This was usually a slitwidth of 0.18 millimeters.

Considering the transmission of water as being 100%, that of the standard phosphate solution as being 0.3%, the decrease of transmission between one sample and another is an expression for the increase in the phosphate content in the solutions. In order to compare those data obtained from the immersion-treated panels having different stripping weights, the data of transmission obtained from the various solutions were again multiplied with the factor: reference stripping weight (75 mg/sq. ft.) divided by the experimental stripping weight. The comparative results for the immersion of the various phosphate coated panels during the described 24-hr. immersion test are given in Table 4.

If phosphate coated panels are tested within a short time after their preparation, such as after 1 hr. drying time, the water solution contains primarily the soluble chemicals retained from the pre-treatment; and the color test gives as expression of this content supplementing the loss of resistance which was determined in the immersion test. If the same kind of panels are first exposed to a corrosive surrounding, such as 95%-100% humidity for 100 hrs., the loss in resistance will be considerably greater; but still it will not cause a different color change at the same time. Some results are given in Table 5.

Table 5

Comparing the resistance losses as the effect of humidity exposure with the transmission test for the amount of retained chemicals from the pre-treatment.

	Result of 2 minute water immersion	
Iron Phosphate I	**Panel Freshly Prepared**	**Panel Exposed over Water 168 hrs.**
Loss in percent resistance....	84.2%	29.1%
Transmission Reading.....	98.0%	98.0%
Difference, or beginning of Corrosion.....	55.1%	
Zinc Phosphate II		
Loss in % resistance.....	84.2%	35.2%
Transmission Reading.....	97.0%	97.0%
Difference.....	49.0%	
Iron Phosphate II		
Loss in % resistance.....	91.0%	9.2%
Transmission Reading.....	98.0%	98.0%
Difference.....	81.8%	

Comment: The correction factor for the transmission readings was not required because the humidity exposure did not change the range of the readings and the readings were, therefore, directly comparable.

Part II-Influence of Presence of Chemical Remnants In Phosphate Treatments on Paint Bonding Qualities

The fact that retained treatment chemicals on phosphated steel surfaces promote corrosion has been reported recently by Clarke and Longhurst.[4] These British authors used humidity-chamber exposure tests; and they found that, in the presence of accelerating agents as part of the phosphate materials, the removal of the chemicals is especially important.

To determine the effect of the still-soluble matter on the paint bonding characteristics, the following test procedure has been applied. First the different pre-treatments were applied on groups of automotive steel panels, The manner of application is shown in Table 6. One set of panels of each type pre-treatment was used without additional treatment, another set of each type was water-immersed for 30 sec., a third set was water-immersed for 60 sec., and a fourth set was water-immersed for 2 min. All panels were then dip-coated with the same OD paint, Fed. Spec. TT-E-485b, Type II. The dry film thickness was determined with the Magne-Gage; and, after electrographic prints were made, all panels were salt-fog exposed simultaneously.

The results, at various time intervals up to 1516 hrs. salt-fog exposure, are shown in Figures 6, 7, 8, and 9. In each of these types of pre-treatment, it is evident that the extra 30 sec. water rinse considerably improved the life of the paint. Whether a 30 sec. or a 60 sec. water immersion might be more effective will depend upon the solubility of the remnants in the phosphate treatment which may vary from case to case. The visual appearance of some of the panel

Table 6

Preparation of the panels for the test series to determine the effect of soluble remnants on the paint bonding characteristics (shown in figures 6-9).

Designation	Type of Pre-Treatment and Concentration of Pre-Treatment Solution	Application	Rinse	Stripping Weight
A	IRON PHOSPHATE I (170 grams in 4 gal. water)	2 min. spray (1 min. each side) 10 p.s.i./70°C.	30 sec. water rinse. 30 sec. chromic rinse at 80°C. pH 4-5. 30 sec. water rinse.	68 mg/sq. ft.
B	ZINC PHOSPHATE I (316 grams and 24 grams NaOH in 4 gal. water) (5 grams accelerator)	2 min. spray (1 min. each side) 10 p.s.i./70°C.	30 sec. water rinse. 30 sec. chromic rinse at 80°C. pH 4-5. 30 sec. water rinse.	147 mg/sq. ft.
C	ZINC PHOSPHATE II (454 grams in 4 gal. water)	2 min. spray (1 min. each side) 10 p.s.i./70°C.	30 sec. water rinse. 30 sec. chromic rinse at 80°C. pH 4-5. 30 sec. water rinse.	160 mg/sq. ft.
D	IRON PHOSPHATE II (170 grams in 4 gal. water)	2 min. spray (1 min. each side) 10 p.s.i./70°C.	30 sec. water rinse. 30 sec. chromic rinse at 80°C. pH 4-5. 30 sec. water rinse.	34 mg/sq. ft.

Figure 6. Electrographic prints showing the effect of additional water immersion before paint application: Iron Phosphate I

Figure 7. Electrographic prints showing effect of additional water immersion before paint application: Zinc Phosphate I

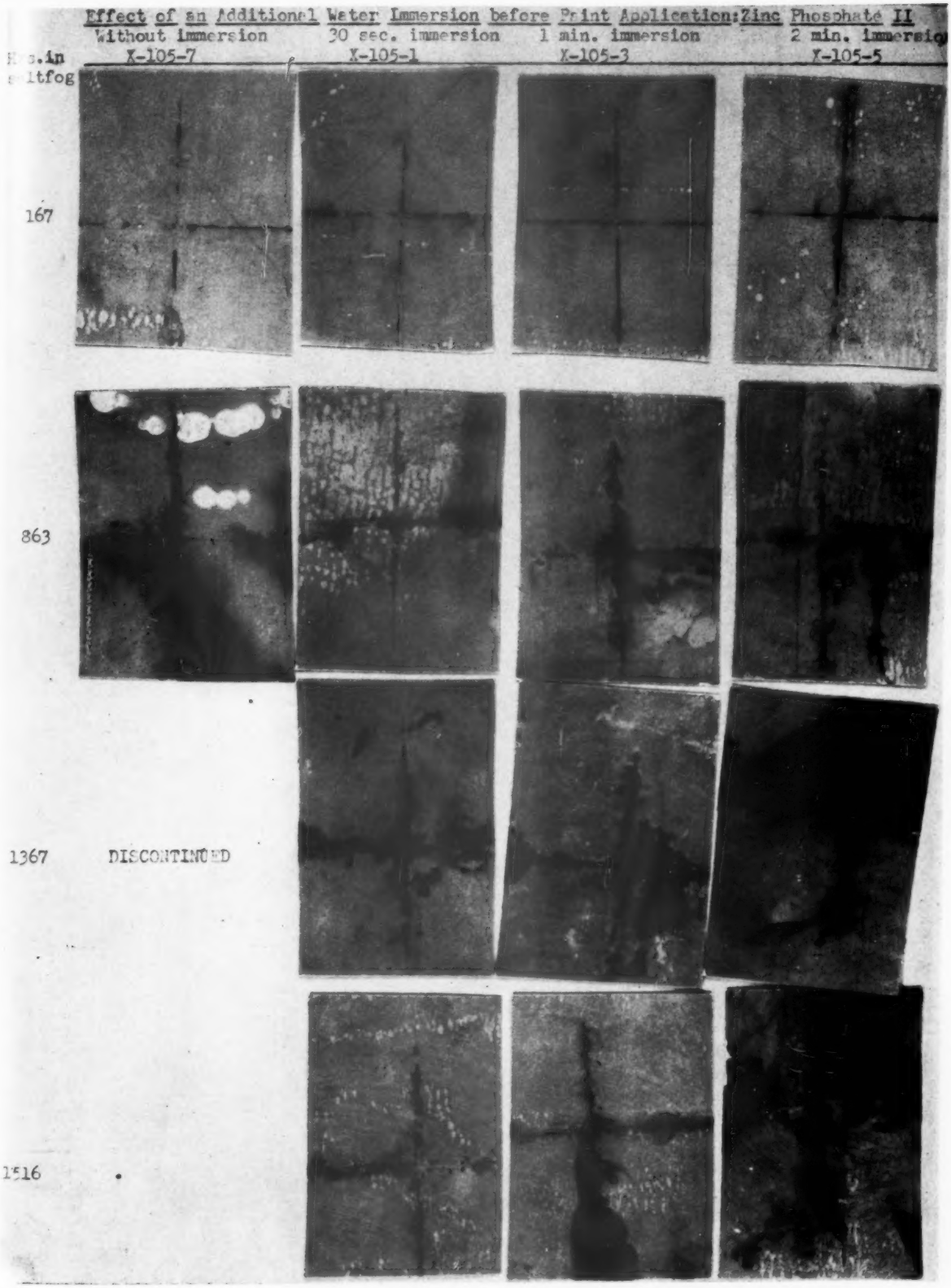

Figure 8. Electrographic prints showing effect of additional water immersion before paint application: Zinc Phosphate II

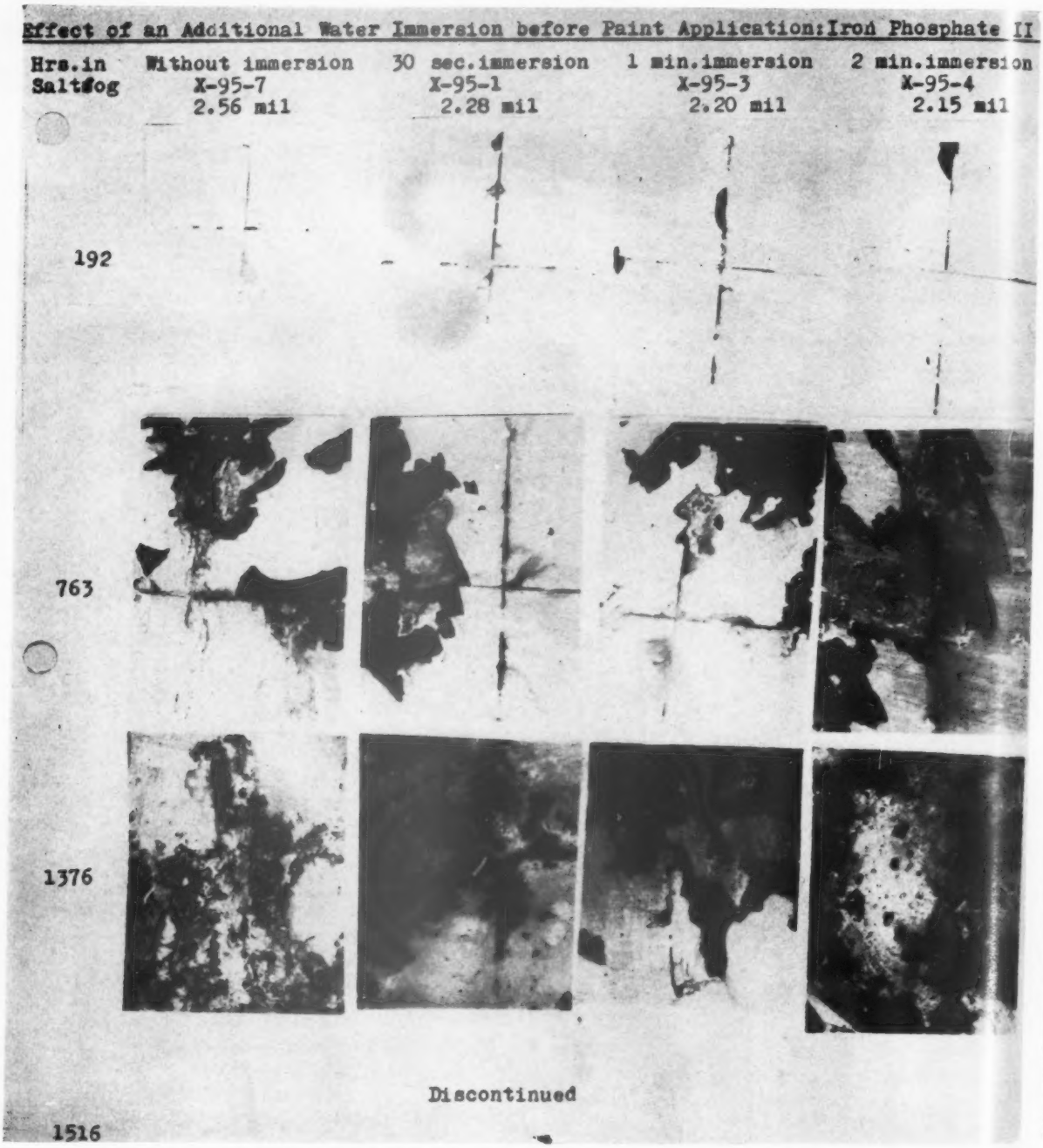

Figure 9. Electrographic prints showing effect of additional water immersion before paint application: Iron Phosphate II

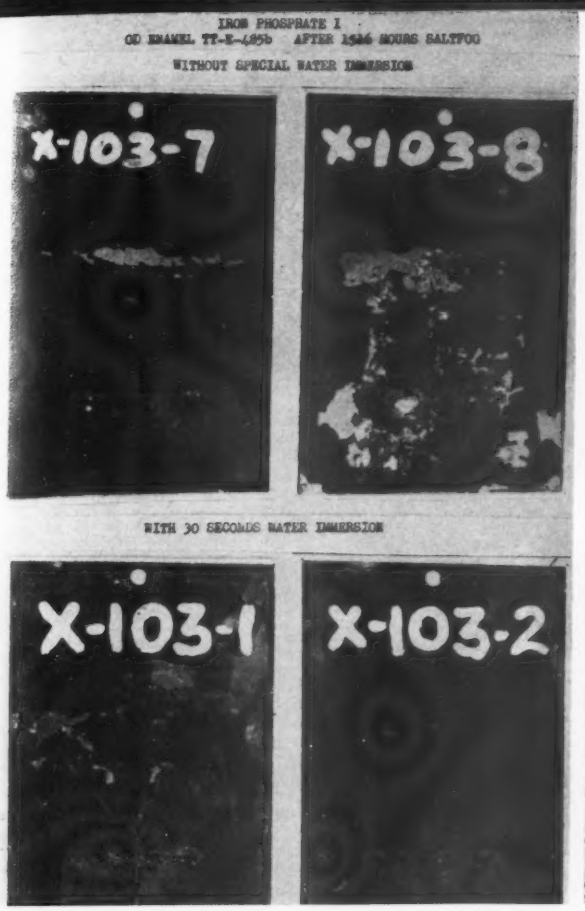

Fig. 10. (above) Electrographic prints of Iron Phosphate I
Fig. 11. (below) Electrographic prints of Zinc Phosphate I

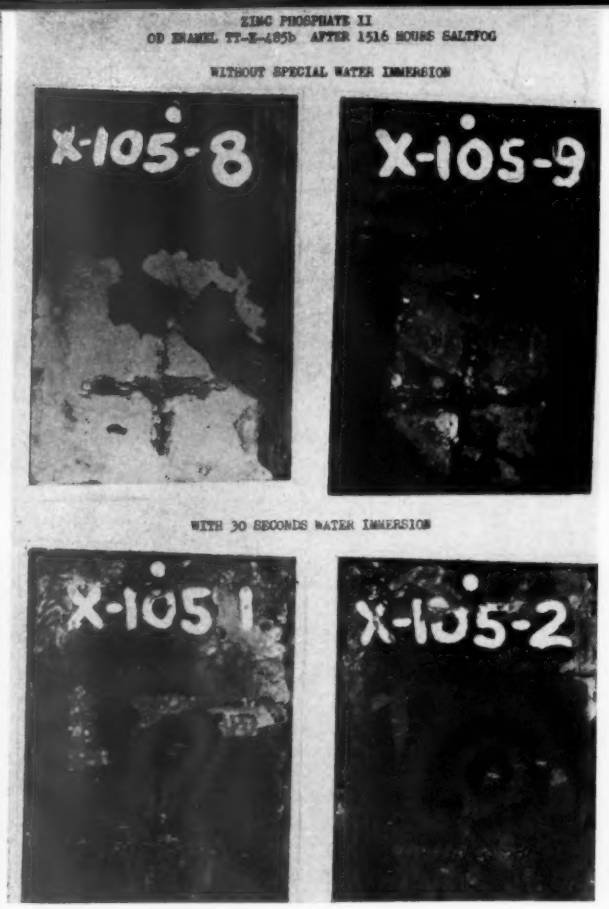

Fig. 12. Electrographic prints of Zinc Phosphate II

series after 1516 hrs. salt-fog exposure is shown in Figures 10, 11, and 12.

As an example for the relation between the water solubility of the material remaining in the surface treatment and the paint bonding effect, Figure 13 shows the effect of a 30 sec. water rinse on the surface material produced by immersion of steel in hot concentrated phosphoric acid. After 68 hrs. salt-fog exposure, the panels without the water rinse failed completely, while those with a 30 sec. rinse were still without defects. With the 30 sec. rinse, the first points of failure occurred after 222 hrs., whereafter they failed considerably more quickly than with any of the less soluble metal phosphate treatments.

Summary

The relation between the content of the still retained soluble matter in metal phosphate treatments and the resulting paint bonding characteristics was studied.

As the work further progresses, the method is also being used for studying the relation between the time of spray application of a phosphate solution and the amount of transformation into insoluble matter. It is being used also in studying the effect of varying any one of the other application conditions in the process, such as temperature or pressure.

Another use of the method presently under study is the comparison of the effect of the same pretreatment materials and methods to different metals.

The methods developed here offer a useful tool in these investigations.

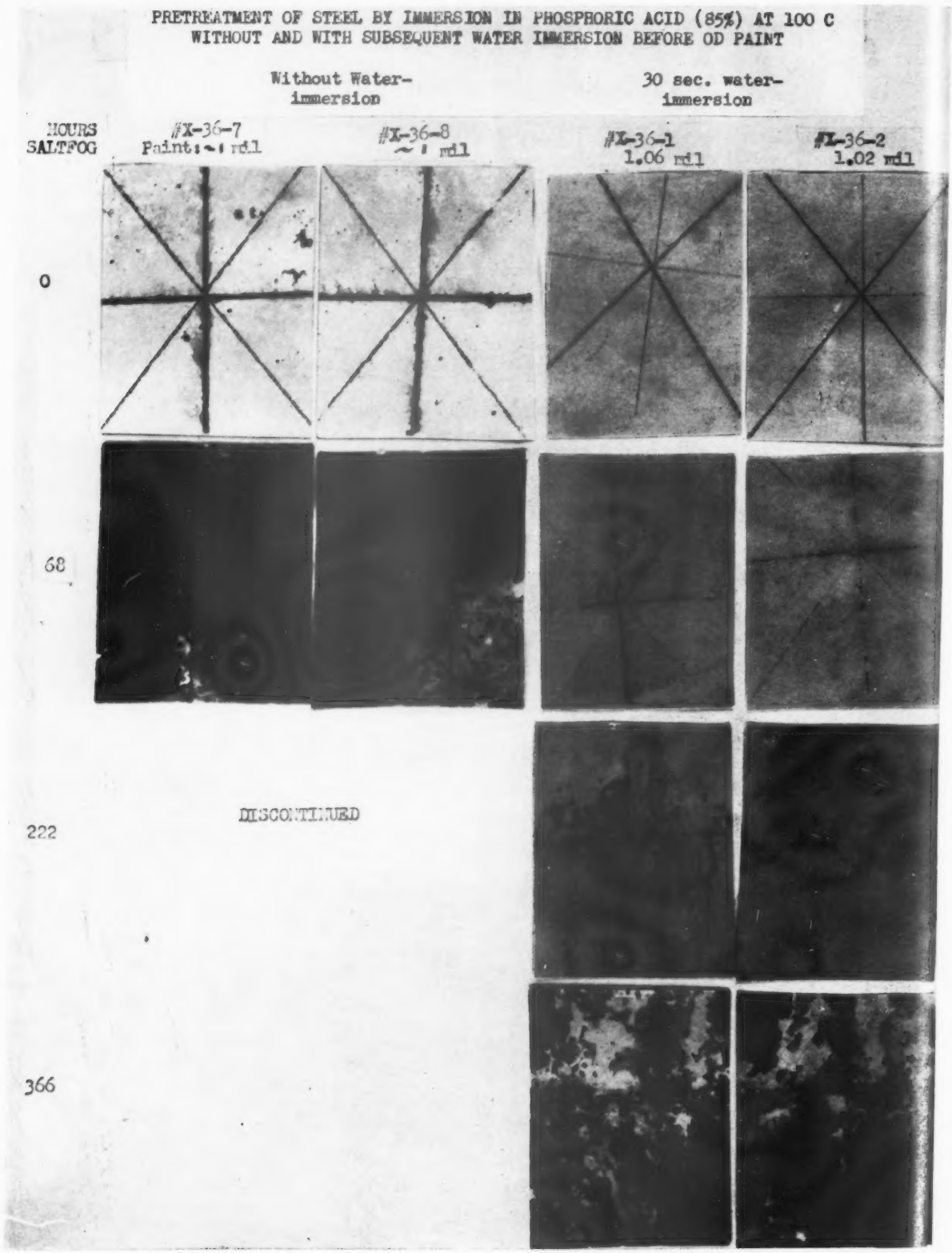

Figure 13. Electrographic prints showing effect of with and without subsequent water immersion before paint application.

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Quality Control In The Paint Industry

PART II

RAW MATERIALS — ACCEPTANCE AND SPECIFICATIONS

By LAWRENCE SHATKIN

THE quality control program begins with the raw materials used in the protective coating industry. In the paint industry, the quality of the raw materials used is one of the most important factors in determining the quality of the final product. Each characteristic of the raw material is related in varying degree to some characteristic of the final product. The quality of the raw material also affects the cost, efficiency, capacity, and safety of the production process. In any efficient chemical process it is absolutely necessary to maintain an accurate control of the quality of incoming raw materials.

It is generally believed that the principles of statistical quality control plus chemical and physical analysis can be used to control chemical raw materials. By these methods, it is possible to detect fluctuations in the quality of incoming raw materials, and comparisons of the same product from different suppliers can be ascertained. This will constantly serve as an incentive for the supplier to maintain his quality standards.

In the paint industry there are several hundred different types of raw materials. These can be categorized as pigments, oils, resins, thinners and driers. Five years ago, thinners and driers were accepted in a perfunctory manner. Today, however, with odorless paints in the forefront, odor of solvents has become very important to the paint manufacturer. Before pigments are purchased, the supplier submits a representative sample which is analyzed in the laboratory to determine oil absorption, mulling, mass tone, tint and strength. If acceptable, subsequent shipments are received checked once again to see whether they comply to specifications, and then put into production.

In the case of oils and alkyd resins closer inspection is necessary. It is here where the author believes statistical methods can be maintained advantageously. The use of alkyd resins is increasing steadily, and any material not within the specification called for, especially with respect to viscosity and acid number, will cause the paint manufacturer to encounter customer complaints. At this point control charts should be set up showing the inner and outer limits of acceptance. Competitive materials can be accurately compared. With respect to alkyd resins, the author has set up control charts of the various alkyd resin suppliers extending over three years, and it is interesting to note that some manufacturers are consistent in meeting specifications, whereas others tend to fluctuate.

Quality Control of Raw Materials

In starting the quality control of raw materials, it is best to start with some materials suspected to be the cause of some manufacturing difficulty, but do not start with a raw material with a very difficult problem. The following general program is given as a guide in tackling the problem. However, different types of chemical raw materials will suggest some variation in this approach: [1,2,3]

(1) Break down the raw material into some unit of production such as tank car, batch, cook, etc.

(2) After reviewing the raw materials that are used to manufacture your product, choose that material which has shown significant variation and which affects to a large degree product quality or process efficiency.

(3) Gather data from the laboratory and other inspection points on each of the properties of the raw materials and group them into convenient sub-groups in the order in which the material was produced.

(4) Determine if the characteristics are in a state of control. Where variations outside the control limits occur, increased sampling may be required. If the system is still out of control, it is advisable to contact your supplier. However, when the chart indicates statistical control of a raw material, it may be assumed to be reliable.

(5) Compare the plotted points with the raw material specifications. If the raw material quality is in control and points along the process of manufacture are in control, reduced sampling can be initiated. However, if the limits for individual batches fall outside the specification, then contact should be made with the supplier. Perhaps a change in his operating con-

trols may be required. At times it may be necessary to change the specification to conform to available suppliers and modify your process to accomodate such materials.

(6) Continue to report any sign of lack of control.

(7) After any modification in the system, it is necessary to recompute the control limits.

Specifications—Definition

Specifications have an important role in quality control in the paint industry. They are concerned with the selection of raw materials, the inspection of the product in process, and the inspection of the final product. A specification is a written statement defining the standard of quality of a thing required for a certain purpose. It is a very important industrial tool because it can bring about that "meeting of the minds" of different people in different positions on quality. By means of an efficient specification, a testing or inspection department can determine the suitability of any unit for the purpose for which the specification is designed. This is exceedingly important in large industries where men of experience cannot spend their time examining all products and raw materials. A well-designed specification is a profitable tool; an inefficient one can be a liability.[4]

In order to create a chemical specification which will define quality, the following fundamentals must be observed:

1. We must select for measurement all the characteristics of the article which are known to be of importance to control for the purpose intended.
2. We must define a method of measuring each characteristic which is precise enough for the purpose and which is related to the quality characteristic under consideration.
3. We must choose a standard of quality which truly represents the best balance between the quality requirements of the consumer and the quality capabilities of the production process.[5]

All too frequently chemical specifications have been established arbitrarily or from past precedent instead of by a scientific method. If a specification is going to do its important job, it must be made for that job, and its creation will require as careful design and workmanship as the development of the process itself. In some cases, it is necessary to make arbitrary decisions, but the chemist or chemical engineer who is setting a specification should use his knowledge of chemistry and production operations coupled with his understanding of the statistical nature of materials, men and machines.

The quality control engineer should learn how to set specifications which are complete and which actually fix the quality definition, but are practical, realistic and possible of profitable fulfillment. They should provide the required assurance to the user and fairness to the supplier.

Raw Material Specification

In establishing a specification for a chemical raw material, all the characteristics, chemical and physical, should be considered, and those selected which are known by chemical theory, production history, or correlation analysis to have a significant effect upon final product quality, process efficiency, safety, or cost. This list may be reduced by eliminating those characteristics which do not vary significantly in comparison with the requirements. Correlation analysis and variance analysis are two scientific methods for choosing those characteristics of importance. Control charts will accurately measure the variation and reliability of any characteristic.

The chemist should also make a study of the accuracy and reliability of any method given to measure each characteristic. He should make sure that the test method is precise enough for the purpose required.

The standard of quality should be selected to establish the best economic balance between the costs of the raw material, the costs of manufacture, and the value of the finished product. When a final product specification has been fixed by the consumer, the raw material standards and the process methods must be designed to fulfill the consumer's requirements. The process must be designed to produce the required final product quality from the available raw materials. In this case, the process design engineer must make a balance between the quality of the raw material and the method of the process to produce the desired final product. The engineer should consider the economic affect and feasibility of using lower raw material quality with improved process methods or conversely of using simplified process methods and improved raw material quality. In any event the engineer must work within the range of available raw materials.

In-Process Specification

Although this part is primarily concerned with quality control in raw materials and chemical specifications, it is felt that some mention of in-process and final product specification should be dealt with here.

In-process specifications are determined in the same general way. Their purpose is to fix the quality and variation of the in-process material at some point during manufacture at which it is profitable and desirable to make an inspection of the in-process material. The relative economic advantages of passing or rejecting or reworking widely varying material at this point in the process should be considered. The limits should not allow any material to pass which is beyond the ability of the remainder of the process to bring it within specifications. Statistical studies form the basis of the scientific selection of in-process specifications.

Final Product Specification

The final product specifications for chemical materials are usually determined by the consumer since the chemical material is frequently the raw material for another process or product.[6] In this case the specification should be created by the consumer in accordance with previous considerations. The job of the supplier is to design a process to meet these specifications or to determine if his present process will meet its specifications. In other cases final product specifications are set by the producer to meet a general demand for a given quality of a chemical material. Sometimes several grades of this material are specified to give the consumer a variety. In this case the economic balance between the cost of material and its value is made by the producer. In any case, the three fundamentals of a chemical specifications must be observed, and the selection of the characteristics, the methods of measuring each characteristic, and the standards of quality should be based upon careful scientific and economic studies in which statistical methods are of important assistance.[7]

Specifications and Control Chart

To compare a production process with a product specification, the control chart is a most effective tool. After the control charts have been set up on the desired properties the following questions should be asked on each control chart:

(1) Are the data within control? If a process is within control the future quality variations of the process can be predicted within limits with reasonable assurance. However, if lack of control is shown, no prediction of future quality can be made, and the remaining questions will not apply. If the process is not in control, then investigation of a trouble shooting nature should be undertaken to find and eliminate the causes of lack of control. All efforts should be directed to

(*Turn to page 66*)

The Reaction Between Styrene and Unsaturated Fatty Acids*

PART II

METHOD FOR SEPARATING POLYSTYRENE FROM STYRENATED AND NON-STYRENATED DRYING OIL FATTY ACIDS

By DR. S. KUT

Summary

A method is described for separating free polystyrene form styrene copolymer drying oil fatty acids and non-styrenated drying oil fatty acids. It is based on the precipitation of all the fatty acids as insoluble soaps from ethyl acetate, the polystyrene remaining in solution. The method is equally applicable to the separation of unsaponifiable material from ordinary non-modified drying oils.

THE products obtained by heating together styrene and drying oils (or drying oil fatty acids) could consist of free uncombined drying oil or fatty acids, polystyrene, and/or some fatty acid chains combined in some manner with styrene. To determine any difficulties that may arise in the analysis of such products, a styrenated oil was prepared and analysed. It was prepared by refluxing in air a partially conjugated approximately 35% raw linseed oil (1 part) and styrene (1 part) in xylene (2 parts) for 36 hours at approximately 150°C, when 94% of the styrene, as determined by a solids content determination, was no longer present as monomer.

Procedure

The standard procedure for separating unsaponifiable (i.e. non-acidic) material from a drying oil was employed. In this method, the drying oil is saponified with alcoholic potassium hydroxide, and an aqueous-alcoholic solution of the potassium soaps (which are formed in the saponification) is extracted with an organic solvent to remove the unsaponifiable matter. In the case under examination, any free i.e. uncombined, and therefore non-acidic polystyrene represented the unsaponifiable matter. However, in attempting such an extraction on the saponified styrenated drying oil, very stable emulsions were formed, and on examination the solvent layer (benzene) was found to have dissolved very substantial quantities of the potassium soaps together with any free polystyrene that may have been present. It is apparent, therefore, that this extraction procedure is quite unsuitable for separating any free polystyrene from the styrenated fatty acids.

This difficulty has also been referred to by other authors (Norris, 1949); Kappelmeier, 1950) and so far no satisfactory method for carrying out this separation has yet been described. Indeed, much experimental work reported in the literature is vitiated, due to some authors ignoring the possible presence of free polystyrene in their reaction products. Thus, they have frequently fractionally precipitated their styrene-fatty acids (or oil) reaction products directly and attempted to draw conclusions from the constants such as iodine values and equivalents of the fractions, without attempting to separate any free polystyrene that may well have been present in their reaction products. The results were, therefore, of little value further than a possible qualitative indication of chemical combination between styrene and the particular drying oils or fatty acids as reacted under certain experimental conditions.

In a fundamental investigation of the reaction between styrene and drying oil fatty acids (or oils) it would be necessary to isolate all fatty acids, styrenated and non-styrenated, from any polystyrene, so that the acids could then be rigorously examined.

Depending on the reactants and conditions of reaction, it is quite conceivable that from some reaction products of drying oils and styrene, where some true copolymerization has occurred, it may be possible by a simple solvent precipitation to separate some free polystyrene. However, in such cases one cannot be certain that the non-precipitated oil or fatty acid fraction is entirely free of lower molecular weight polystyrene, which would not be precipitated under the experimental conditions. A chemical investigation of the non-precipitated oil or fatty acid fraction could, therefore, be inexact and misleading. It was clearly desirable to devise a method for separating all polystyrene from all the oil

*From a Ph.D thesis 1951 University of London, London, England, by S. Kut. Dr. Kut is connected withe Pearl Varnish Co., Ltd., Treforest Trading Estate, Pontypridd, S. Wales, Britain.

or fatty acid products of reaction.

The difficulty in attempting to apply a solvent separation of the styrenated and non-styrenated fatty acids from polystyrene is due to the very similar solubility properties of polystyrene and the more heavily styrenated fatty acids. In searching the literature, no method applicable to this particular case could be found, the analytical procedures described are aimed at the separation of the fatty acids from each other rather than from a non-acidic component. Where this is required, the standard procedure for separating unsaponifiable matter (as described above) is generally used.

Precipitation Methods

One method of enhancing the solubility differences between polystyrene and styrenated and non-styrenated fatty acids is concerned with precipitating all the fatty acids as insoluble soaps from a polystyrene solvent. The polystyrene will remain in solution, whereas the fatty acids could readily be recovered from the precipitated soaps by acidification.

Similar precipitation methods, such as the lead acetate-alcohol separation (Markley, 1947) have been used for many years in the analysis of drying oil fatty acids, but these were all aimed at separating saturated and unsaturated (or unsaturated from more unsaturated) acids, by utilising the higher solubility of the unsaturated fatty acid soaps. Furthermore, in most of these methods, the inorganic salts used as precipitants were soluble in alcohol, and alcoholic or aqueous-alcoholic solutions were employed as the precipitation media. The use of predominantly alcoholic or aqueous media was of course inadmissable in the presence of styrenated products, for which water and alcohol are non-solvents. Furthermore, it was desired to precipitate *all* the fatty acids and to separate them from the non-acidic polystyrene.

The possibility of, for example, the styrenated fatty acid potassium soaps being sufficiently insoluble in a polystyrene solvent for a direct separation, by a Soxhlet extraction appeared very unlikely, especially in view of the work of Innes (1941). He showed that the solubility of calcium soaps under conditions of Soxhlet extraction was far higher than when merely suspended in the solvent. Even when the solûbility is low, on Soxhleting, more and more soap is extracted since the soap is continually dissolved with fresh solvent.

An extensive series of experiments was carried out to determine a suitable method of separation. It is proposed to give only particulars of the method finally evolved, since reference may be made elsewhere (Kut, 1951) for full details of the development of this method.

Suggested Method

The styrenated oil or fatty acids are converted to the potassium soaps, and the dry 'styrenated soap' residue is isolated, taking the normal precautions to prevent atmospheric oxidation. In the case of the fatty acids, the potassium soaps can be readily obtained by neutralization with alcoholic potassium hydroxide in a non-aqueous media, followed by stripping of the solvent. With oils, the saponified product may be used directly only if there is very little excess of alkali. However, if the saponification has been carried out in non-aqueous solvents, e.g. alcoholic potassium hydroxide and and benzene or toluene, the excess alkali can be exactly neutralized, and the precipitated inorganic salt filtered off. Evaporation of the filtrate will then yield the 'styrenated soap'. This should be free as far as possible from any solvents, since these would increase the solubility of the soaps in the subsequent separation. To the soap, sufficient pure, anhydrous, neutral ethyl acetate to form a 6-12% solution is added. In the presence of high molecular weight polystyrene, it may be necessary to allow the suspension to stand overnight and/or refluxing in an inert atmosphere, to permit the slow solubilization of the polystyrene to go to completion before proceeding with the analysis. The ethyl acetate-soap mixture is then heated to boiling and the soaps dissolved by the addition of water sufficient to just saturate the particular volume of ethyl acetate at room temperature (generally 2.4ml. water/100ml. ethyl acetate, as may be easily determined by gradually adding water at room temperature to the ethyl acetate being used). The soaps dissolve almost immediately on the addition of the water, to give a clear bright non-viscous solution. To the still warm soap solution, excess anhydrous calcium chloride is added. (1 gm. calcium chloride per 0.3 ml. of water used is ample.) The calcium chloride first swells slightly, and then gradually breaks up. The precipitate formed is a fine white powder, usually settles well and contains very few unreacted calcium chloride granules. It may be experimentally demonstrated (Kut, 1951) that at this stage partial or complete double decomposition occurs between the potassium soaps and the calcium chloride with the formation of the less soluble calcium soaps.

After allowing to stand overnight, the solution is filtered, or preferably centrifuged (to minimize atmospheric oxidation and to increase the efficiency of the washing of the precipitate). The precipitate is thoroughly washed with anhydrous ethyl acetate. The filtrate and washing are combined, concentrated to about 50-100 ml., a little anhydrous calcium chloride added (approximately half the quantity used in the first precipitation is sufficient), the solution left to stand overnight, and the above procedure of filtration, washing, concentration and precipitation repeated until no more appreciable quantities of soaps are precipitated. The amounts of calcium chloride added can be progressively reduced. Depending on the particular product being examined, two to four such precipitations will be found adequate.

Many experiments have shown that by this procedure approximately 99% of the fatty acids, as measured by the carboxyl group, are precipitated as soaps. Due to the somewhat similar solubility characteristics of the two components being separated, a 100% precipitation could hardly be expected, and the degree of separation attained, i.e. 99%, can be considered as satisfactory. Two factors probably contribute to 1% not being precipitated. Firstly, a finite solubility of the soaps in ethyl acetate, and secondly, a little hydrolysis of the soaps may occur, the fatty acids formed being readily soluble in the ethyl acetate. Such hydrolysis is in practice limited by heating the ethyl acetate-soap solution as little as possible after addition of the water, in fact only sufficient to obtain a clear solution. By this procedure, it is therefore possible to separate a styrenated product into two components: (a) a polystyrene free fraction of fatty acids, and (b) a polystyrene fraction of very low acidity. Fraction (b) is isolated by acidifying the last and final ethyl acetate filtrate with dilute mineral acid, washing the ethyl acetate solution free from mineral acid with water, drying over anhydrous sodium sulphate, and then stripping the solution to constant weight (the final traces of solvent, after distilling off as much as possible, are readily removed in a vacuum desiccator). The equivalant of the polystyrene (i.e. fraction (b) is then determined by simple titration with alcoholic potassium hydroxide, sufficient benzene or toluene being added to the polystyrene to prevent precipitation during the titration. The equivalant of fraction (b) will be found to be large (i.e. low acidity). From a comparison of the equivalants, and possibly molecular weights of fractions (a) and (b), it is possible to determine the limiting value of free polystyrene present in the reaction product to a sufficient degree of accuracy. However, it is of greater importance that with this method, one can obtain the fatty acid products of reaction free from polystyrene, thus making their exact study possible.

The calcium chloride used in the above method could no doubt be replaced by anhydrous magnesium chlor-

le, but since Blitz and Roehrs (1923) ound the magnesium soaps of fatty ids to have a greater solubility than e calcium soaps, such a replacement ould probably lead to a lower degree f precipitation, particularly as the ifference of solubility would be more ronounced for the styrenated soaps.

The use of water in sufficient quanty to just saturate the ethyl acetate t room temperature is in fact more ater than is required to cause solution f the soaps, but it has been found to e the optimum quantity which will ause a maximum precipitation of the oaps. If smaller amounts of water re used, all the soaps are not precipitated, i.e. a lower degree of separation is obtained.

No insolubility has been observed when preparing ethyl acetate-soap solutions, even in the presence of high molecular weight polystyrene (about 80,000). However, should any turbidity or throw out be obtained, due to the presence of very high molecular weight styrenated products, clear solutions can readily be formed, by using only sufficient water to just cause solution. This may slightly reduce the degree of separation, but is necessary where the amount of water recommended causes precipitation of very high molecular weight styrenated products (which in practice would rarely be present).

Alcohols also promote the solution of potassium soaps in ethyl acetate, but the use of water is strongly preferred.

An interesting point regarding the further precipitations required to obtain maximum separation, is that if the first (and major) precipitate is not washed, analysis shows a precipitation of about 99% of the fatty acids (as soaps). It appears therefore that on washing with anhydrous ethyl acetate (to remove any polystyrene adsorbed and entrained in the precipitate) some of the soaps, possibly unreacted and more soluble potassium soaps, redissolve and the re-precipitations are therefore required.

The new method may find application in the separation of other similar polymeric products. It can be used with advantage in the separation of unsaponifiable material present in ordinary non-modified vegetable oils. In such cases as the latter, only one re-precipitation is normally required, owing to the lower solubility of non-styrenated potassium and calcium soaps. This method is a simpler procedure than the conventional solvent extraction from an alkaline soap solution, and suffers none of the chief disadvantages of that method, namely the formation of emulsions, which frequently form and the use of relatively large volumes of solvents, often added to counter the formation of emulsions. Provided that conditions previously referred to are adhered to, the method could be applied directly to the saponified product. The unsaponifiable matter will of course be the ethyl acetate soluble fraction. It may be noted here that when styrenated drying oils are separated by this method, the ethyl acetate will also contain the unsaponifiable matter from the oil. An allowance can readily be made for this small amount.

It is of interest to note that in the case of linseed oil fatty acids (other fatty acids were not tested,) it would probably behave in a similar manner; about 96% of the fatty acids may be separated as potassium soaps by merely dissolving the potassium soaps in ethyl acetate-water as described above, and allowing the solution stand overnight, and not washing the precipitate. This result is obtained by using water sufficient to saturate the ethyl acetate at room temperature (i.e. as in the recommended procedure above). However, if less water is used, a lower degree of separation is obtained. Thus, using just sufficient water to dissolve the soaps and otherwise identical conditions, only 81.5% of the fatty acids precipitated really crystallised after standing overnight. This simple potassium soap recrystallisation' may be of use elsewhere. As in the previous experiments, modification of this simple procedure by the addition of calcium chloride, and washing of the precipitated soaps led to a separation of over 99%. In the case of the styrenated soaps (obtained from the styrenated oil described), the simple potassium soap recrystallisation' (i.e. no addition of calcium chloride) led to a precipitation of 60% of the soaps when using the optimum quantity of water, and only 42% when just sufficient water to dissolve the soaps was added. This is to be expected, since the styrenated potassium soaps have a higher solubility in the ethyl acetate-water medium than the non-styrenated soaps. In the precipitation of the styrenated soaps by the recommended procedure using calcium chloride, the quantity of water used appreciably affected the amount of soaps precipitated (5-6%), but to a lesser degree than in the simple 'potassium soap recrystallisation'.

Amongst other advantages of the use of ethyl acetate, apart from its favourable solubility properties under the above experimental conditions, may be noted that it is not only a good solvent for even high molecular weight polystyrene, but also that its polystyrene solutions have low viscosities.

Discussion of the Method

No other reference to the marked effect of water on the solubility of soaps in esters have been found in the literature, although similar solubility phenomena have been recorded for hydrocarbons (Lapworth, Pearson & Mottram, 1925; Weichherz, 1928). Some explanations can be offered for the solubility phenomena observed, as described above. Firstly, the solubility of the soaps in ethyl acetate-water may perhaps be explained by analogy with Palit's (1941-1949) work on the co-solvency of hydrocarbons and hydroxylic compounds for soaps. It is suggested that the water in the ethyl acetate-water solvent mixture corresponds to the glycols used by Palit, and dissolves the COOK group by hydrogen bonding. The ethyl acetate, on the other hand, represents Palit's 'H' solvent, and acts as co-solvent by dissolving the hydrocarbon chain.

It has been noted above that the amount of water present in, what has been termed the 'potassium soap recrystallisation', governs the efficiency of recrystallisation. This effect could also be explained by analogy with the work of Palit, who had found optimum solvent compositions yielding maximum solubility. Thus, in the case of the ethyl acetate-water solvent mixture, there could exist a solvent composition having minimum solubility for the potassium soaps. However, when calcium chloride is used (as in the recommended method), the picture is less clear. The experimental evidence indicates that a double decomposition occurs in the presence of the water, though this reaction is probably incomplete, unreacted potassium soaps also forming part of the precipitate. It is these latter soaps which probably dissolve more readily on washing the precipitate with ethyl acetate. Since one would expect the calcium chloride to remove the water present, it is surprising that the efficiency of these calcium chloride precipitations is also affected by the quantity of water present.

The observations of Harrison (1924) and Pink (1938 & 1939) (confirmed in experiments not reported here) that the solubility of calcium soaps in organic solvents is reduced by traces of water and the findings of Fischer, McLaughlin and Hook (1922) that relatively small amounts of calcium soaps can fix large amounts of water, may have a bearing on this problem. Similarly, Pink's (1938,1939) observations that very small amounts of water are sufficient to precipitate from an organic solvent large quantities of a soap, such as magnesium oleate as a hydrated compound should be borne in mind. As little as 0.25% of water could remove almost 4% of magnesium oleate. In the separation described

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News of Paint and Varnish Production Club Meetings

E. J. Dunn, Jr.

Fred Steig

New York

The regular monthly meeting was held October 1st at the Brass Rail in New York City. Two hundred and fifty members and guests attended and heard the annual reports of the Technical Committee Groups.

At the conclusion of the business session, E. Dale Albert, President turned the meeting over to the Technical group. C. Englhardt, chairman of Technical Committee acted as M.C.

Stanley H. Richardson, Chairman of the Sub-committee on "Investigation of Methods for Measuring Drying Time" reported that his group, having completed work on a dust free tester, has concentrated on a method for measuring the tack free time. This second phase has proved to be somewhat more difficult than anticipated. Their work will continue in an effort to find a better method than now existing and if possible to accurately define test conditions so that different laboratories can achieve reproducible results.

"A Study of Pigment Dispersion," was reported by Raymond L. Whitney, Chairman, who said that the current phase of the committee work involves the study of the most efficient method for dispersing colored pigments on roller mills. The committee has found that with colors they not only have texture or fineness of grind to contend with but also color development. So far results have shown that relatively high vehicle solids (60-70%) are superior to a lower solids vehicle for mixing and grinding.

Sub-committee 40, Edward J. Dunn, Jr., Chairman, on "Methods of Measuring the Dry Hiding Power of Paints" has established a simplified technique of making hiding power determinations. By instituting the determinations of wet film thickness by direct measurement with the Interchemical guage and through the use of structural black and white plate glass for spreading uniform films. It is claimed that good hiding power determinations can be made in one-fourth the usual time. Another advantage is that determinations can be made of hiding powers in the 800-900 square foot range that would be impossible on cardboard charts.

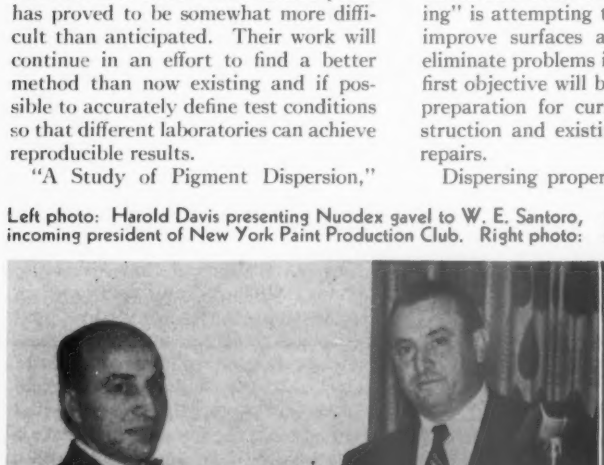
Sidney B. Levinson, Chairman of Sub-committee 64 on "Interior Sub-Strata and Their Preparation for Painting" is attempting to determine how to improve surfaces and thus reduce or eliminate problems in repainting. Their first objective will be a study of surface preparation for current new wall construction and existing walls in need of repairs.

Dispersing properties of vehicles has been a source of concern to the paint manufacturer for a long time. The Sub-committee under the chairmanship of Ben Farber is attempting to do something about this in a "Test Method for Evaluating the Dispersing properties of Vehicles". A Paint manufacturer, today, does not have to break down or grind the pigment particles but merely disperse them properly. Each pigment particle has an envelope of air and moisture surrounding it that must be displaced by the vehicle and is known as wetting. These wetted particles sometimes from clumps which must be further separated. Finally a controlled degree of flocculation must be induced to give the optimum in consistency, brushability, anti-settling, etc. All of these factors are being considered in the development of a testing method that they hope will serve as a guide for comparative wetting properties of vehicles.

The sub-committee "Solvents" with E. G. Shur as chairman, is experimenting with various procedures to determine the comparative evaporation rates of solvents from resin and pigmented basis.

Fred Steig as acting chairman of the sub-committee on "Emulsion Paints" previewed the paper presented at Atlantic City. The work of this group was limited at this time to a study of latex paints. Because of the wide variety in composition of commercial latex paints the committee decided to prepare their own representative latex paint on a simplified formulation. The first phase for study thus became the effect of various methods of preparation upon the properties of the selected latex system. A determination was made of the effect of various grinding media, such as the three-roller mill, the high-speed mixer, high-speed stone mill, colloid mill and pebble mill, on the characteristics and stability of six latex systems. Details of procedure and preparation were

Left photo: Harold Davis presenting Nuodex gavel to W. E. Santoro, incoming president of New York Paint Production Club. Right photo: Club's new Technical Committee. Left to right: Herbert Hillman, vice-chairman; Anthony Skett, chairman, and Edward J. Dunn, Jr., Secretary.



given for each type of equipment and subsequent tests detailed as to method and results tabulated.

The regular monthly meeting was held November 5, at the Brass Rail in New York City. The affairs of the evening covered induction of the new officers, a short talk by Dr. Waters of The Shell Oil Company and a showing of the June Outing motion pictures.

From the year end reports given by the various officers it was learned that the club now consists of 435 members. The attendance at the meetings showed an average of 218, some 60% being club members, and the balance guests.

Carl Engelhardt, Chairman of the Technical Committee, gave his final report. He is stepping out of the Chairmanship of this committee after serving seven years.

As his last official act, E. Dale Albert the outgoing President introduced W. E. Santoro as the President for the New Year.

W. E. Santoro then introduced John Congleton as Vice President and Chairman of the Program Committee, Irving Flaumenhaft as Secretary and Ernest S. Paterno as Treasurer.

The New Technical Committee consists of Anthony Skett as Chairman, Herbert Hillman as Vice Chairman and Edward J. Dunn Jr. as secretary.

Dr. George W. Waters of The Shell Oil Company gave a short talk on "Alkyd Reduction Technique." He said the present day odorless solvents have a very low solvency value, as a result many alkyd formulations are insoluble in this odorless thinner. The investigation conducted by Dr. Waters showed that by the addition of their compound, Additive 108, an alkyd could be reduced with odorless solvent.

Baltimore

The meeting, held Oct. 9, was featured by the presentation of two papers: "Wollastonite" by Franklin King, Jr., and in Atlantic City, "A Comparison of Oleoresineous and Latex Interior Finishes" by Leonard Cohan.

New England

Inventory controls, specification business, and efficient use of equipment were a few of the many topics covered in a round table discussion on "Production Planning and Scheduling" at the October 15 meeting of the New England Paint & Varnish Production Club, held in Boston, Mass.

Eighty-six members and guests actively participated in the discussion led by Peter B. Marsden. The panel was composed of the following five club members: Harold E. Ellsworth, William R. Holmes, Gordon Menges, Richard Swanson and Henry B. Twombly.

On November 19, Franklin King Jr. of Godfrey L. Cabot Inc., is scheduled to address the Club on "Wollastonite and Its Applications in the Paint Industry."

"Wollastonite and its Application in the Paint Industry was the feature topic at the November meeting.

The speaker, Franklin King, Jr., Godfrey L. Cabot, Inc., with the aid of slides, outlined comparisons of Wollastonite, talc, and calcium carbonate extenders in various finished products. Among the properties considered were enamel holdout, settling, and grinding rates.

Chicago

The Club held its October meeting on the 5th, at the Furniture Club of America with 126 members and guests in attendance.

The seminar course on "Modern Developments in the Paint Industry" being co-sponsored at the Illinois Institute of Technology was reported by Harlan Bogie to be well on its way. There is a registration of 104 with the major portion of the registrants coming from industry. To date lectures by Dr. H. F. Payne on "Latex Paints" and by Lyman P. Hunter on "Color Theories and Their Application have been given."

President Hugh H. Price announced that one of the members, Arne Brolin of the technical service department, Sherwin-Williams Company, had delivered a talk on "Finishes and the Industrial Designer" to the junior and senior students at the Chicago Art Institute.

The annual election of officers was held. The officers for the 1953-54 year will be: Robert J. Gnaedinger, President; Warren C. Ashley, Vice President; Robert R. Bruhn, Secretary; Sidney Daneff, Treasurer; and R. H. Marberg, Sergeant-at-Arms. Also elected for a two year term was Thomas F. Byran for Council Representative.

S. J. Fecht, President of S. J. Fecht & Associates, presented a talk on "The Easy Way Out" or a "Scientific Method of Cost Reduction." The key to cost reduction is to gain the cooperation of the personnel by keeping the employees well informed and well trained. The employees will try, and will try successfully, to reduce costs if given a chance to be recognized and the right to feel important. Movies of some of the operations at Illinois Paint Works were also shown.

W. M. Gearharty, Chief Chemist, Chemical Sales Development Laboratory, Eastman Chemical Products, Inc., discussed the use of Half-Second Butyrate as a film former at a meeting held November 2.

C-D-I-C

The 333rd meeting was held at the Alms Hotel, Cincinnati, Ohio, October 12, with 55 members and guests attending.

Speaker for the meeting, Henry Beaks of the Kentucky Color & Chemical Company, discussed the meaning of the tinting strength test for colored pigments, such as, the effect of varying the amount of work on tinting strength results. Next the distinction between tinting strength and coloring power.

The relative importance of Brightness, Saturation, and Hue was discussed, as related to the judging of tinting strength; then the relationship between mass brightness and tint brightness. Mr. Beaks then explained the nine properties of pigments and the need for evaluating them, and the distinction between a combination of colored surfaces and a mixture of colored surfaces.

Tinting strength, coloring power and co-efficients of absorption were compared. Finally it was demonstrated why a mixture of light Chrome Yellow and Light Chrome Orange cannot satisfactorily match Medium Chrome Yellow.

The 334th Meeting was held in Dayton, Ohio, on November 9.

Speaker of the evening was Fred Steig of the Titanium Pigment Corporation, Technical Service Laboratories, who presented a paper entitled, "The Effect of Pigmentation on Modern Flat Wall Finishes."

An ammendment to the by-laws establishing an Executive Committee and establishing the scope of its duties was passed when voted upon.

D. Glaser

H. Witcoff

Northwestern

The meeting was held October 9, in St. Paul, Minn., with 58 members and guests present.

The nominating committee under the chairmanship of Dave Glaser presented the names of Jake Scala, President, Elmer Stark, Vice President, Merton Hilke, Secretary, and Joe Kenney, Treasurer. The men were elected.

After a short recess the meeting was taken over by Jake Skala, program chairman. This meeting covered the combined work of the 1953 Technical Committee and the Open Forum Committee. Dave Glaser led off by briefly tracing the growth of production of epoxy resins from one-half million pounds in Europe in 1947 to thirteen million pounds in 1952, the greater part being produced in this country. The various methods of curing epoxy resins

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Federal Procurement Review

RENEGOTIATION REGULATIONS AND PROCEDURES FOR DEFENSE BUSINESS

By **HARRY GROSS**

In the interest of those companies selling paints and coatings directly or indirectly to the Government, we are pleased to present another article of major importance by an authority who has had broad experience in this vital field of Defense Contracts accounting.

Reprints of this article are available from Harry Gross, 33 West 42nd Street, New York 36, New York.

"Too little, too late",—this axiom often applies to many companies with Defense Business, in connection with their properly planning for renegotiation. Failure to accumulate the necessary cost data and information may prove very costly in the preparation of Renegotiation Reports, which are required to be filed with the Renegotiation Board after the close of the fiscal year. Paint and coatings manufacturers, distributors and brokers with sales which originate or emanate from the designated government agencies, must submit the proper forms within three months after the close of the fiscal year.

These companies should be aware of the fact that after a year is over, much of the necessary information and cost data may be very difficult or impossible to obtain and segregate. A great deal can be done to facilitate this problem before the books are closed for the fiscal year. The substantial refunds to the Government, which very frequently result from Renegotiation Proceedings, warrant the utmost precautions in planning by paints and coatings manufacturers, dealers and brokers as long as their sales stem in any manner from Defense Business. Following are some essential highlights regarding the procedures which must be considered, and action taken, in accumulating the required data for the Renegotiation Reports.

Mr. Gross is a Certified Public Accountant located in New York City specializing in Defense Contracts accounting. He holds a BBA degree in accounting and is a member of the National Association of Cost Accountants and the New York State Society of CPA's. He was formerly in the service of the United States Government where he performed similar duties in the auditing of defense contracts.

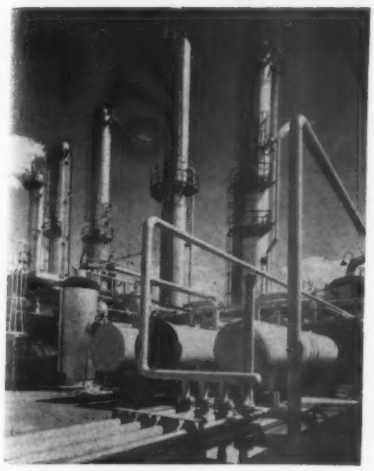
Business Subject to Renegotiation

All sales of paints and services should be analyzed carefully to determine which are subject to Renegotiation. Companies having Defense Business at a lower tier will require greater precautions to establish the correct data, since it is their responsibility to take the necessary steps in determining the status of business. It is also significant to determine whether and when renegotiable sales total the statutory amounts for the year.

Renegotiable Costs and Expenses

Of vital importance too is the problem of apportioning costs and expenses applicable to renegotiable business. A practical cost accounting system and procedures should be established and applied consistently throughout the year. It is preferable to have the cost records tie in with the regular books of account. The system would vary depending on the problems of the particular business and the primary requirement is that the method employed is equitable and can be properly substantiated. Frequently, cost accounting data can be procured from paint production records. Direct costs and expenses properly chargeable to renegotiable sales very easily can be overlooked if they are not recorded as incurred.

Many companies encountered intricate problems in filing renegotiation reports for the initial year of the new law, 1951; some still encountered difficulty in substantiating the figures submitted for 1952. Now that the law is fairly well established there should be no excuse for not following the rules and regulations as spelled out by the Renegotiation Regulations. With the Government increasing the volume of paint production being done by private industry, a greater number of companies will be subject to Renegotiation. The prudent will carefully avoid the pitfalls, bearing in mind that for companies engaged in defense business, renegotiation may be even more important than taxes.



New National Petro-Chemicals plant at Tuscola, Ill. recently dedicated.

Fifty Million Dollar Industrial Chemicals Plant Dedicated in Ill.

Dedication of the new 50 million dollar National Petro-Chemicals Corporation plant, Tuscola, Ill., which produces hydrocarbons and industrial chemicals from natural gas, took place recently on the 500-acre site four miles west of Tuscola.

The new plant is owned 60 per cent by National Distillers Products Corporation, which manages and operates it, and 40 per cent by Panhandle Eastern Pipe Line Company.

Several hundred leading figures in business, finance and politics, including United States Senator Everett M. Dirksen (R) of Illinois, attended the ceremonies.

Including two integrated plants of National Distillers' U.S.I. Chemicals Division, the new complex comprises seven major producing units.

Petro-Chemicals' ethylene plant, the largest single unit of its kind ever built, can turn out 200 million pounds a year, a firm release said. The synthetic alcohol unit, one of the largest in America, can make 125,000 gallons a day of 192 proof alcohol, the release added.

A site at Petro-Chemicals is now being prepared for another major unit. This will turn ethylene into polyethylene. The first polyethylene unit will be in operation by the second quarter of 1955, initial production will be about 75 million pounds a year, with further expansion scheduled for the ensuing two or three years, according to company spokesmen.

Spray Painting and Equipment Discussed at AFL Painters School

A session on spray painting and equipment was given recently at the A.F.L. Painters and Decorators Apprentice School in Cleveland, Ohio, by L. W. Lammiman, Technical Service manager of the DeVilbiss Company, Toledo, O.

In addition to the apprentice painters at the school, journeymen painters from the Cleveland area attended the session.

Mr. Lammiman traced the history of spray painting and its effect on industry. He also pointed out the importance of correct equipment.

George Stoddard, in charge of the DeVilbiss Company Spray Painting School in Toledo, demonstrated some equipment and the covering power of paint over a variety of surfaces when the material was applied correctly. Other demonstrations included spatter finishes, mastic finishes, stenciling and flock application.

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New Products and 1954 Prospects Discussed at Glidden Meeting

New products, progress made during 1953 and prospects for the coming year were discussed at a Glidden Company, Cleveland, O., management meeting held November 16-18, at the Hotel Carter in Cleveland.

Some 100 paint and varnish division regional directors, industrial and trade sales managers and other key personnel from all parts of the United States attended the sessions.

Among the new products discussed were a new line of special coatings and color styling for the air conditioning industry, and a new primer said to be extremely resistant to moisture and corrosion.

Also covered were latest developments in latex emulsion paints for exterior and exterior home use, and the firm's new rubberized exterior masonry paint.

A. D. Duncan, vice president of the Glidden Company and general manager of its Paint and Varnish Division, headed the three-day meeting.

He said that 1953 was the "biggest year ever" for Glidden.

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Glycerine & Fatty Acids to Be Discussed at Soap Meeting

Divisional meetings dealing with glycerine, fatty acids, industrial and specialty soaps will be included in the program of the Annual Convention of the Soap and Synthetic Detergent Industry, scheduled for January 26-28, 1954, at the Waldorf-Astoria Hotel, New York, N. Y.

In each of the divisions, emphasis will be on analysis of user-requirements and better ways of meeting them.

J. J. Morsman, treasure, National Lead Co. (left), receiving bronze "Oscar."

National Lead's 1952 Stockholder Report Judged Best in Paint Ind.

A bronze "Oscar" has been awarded the National Lead Company, New York, N. Y. for publishing the best 1952 annual report to stockholders in the paint and coatings industry.

The award, sponsored by Financial World Magazine, and determined by an independent board of judges, is the sixth in the past seven years won by National Lead.

An award dinner was held October 26, in the Statler Hotel, New York, attended by some 1,400 business and financial executives from all parts of the United States and Canada.

More than 5,000 reports in 100 industrial classifications were considered before final ratings were made. The initial screening was handled by 20 financial analysists under the direction of Sidney B. Lurie, president of The New York Society of Security Analysts, Inc.

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Neville Opens Warehouse Facilities in Philadelphia

The Neville Chemical Company, Pittsburgh, Pa., has opened new warehouse facilities in Philadelphia.

Neville has warehouses in operation at Los Angeles and San Francisco, Calif.; Montreal and Toronto, Canada, and South Kearny, N. J.

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Borden Co. Acquires American Polymer Corp. of Peabody, Mass.

The American Polymer Corporation of Peabody, Mass., has been acquired by the Borden Company New York, N. Y.

American Polymer plants in Illiopolis, Ill., Montreal, Canada, and San Paolo, Brazil, as well as the Peabody plant are included in the transaction. All the plants produce resin emulsions and solutions of various types from a number of base monomers used in paints and other items.

Ten Million Dollar Expansion Program Announced by Reichhold

A ten million dollar expansion program will be instituted by Reichhold Chemicals, Inc., New York 22, N. Y., it was announced recently by Henry H. Reichhold, chairman of the board, following a directors meeting.

The program calls for the improvement and enlargement of production facilities in all twelve of Reichhold's plants in the United States.

Mr. Reichhold said such products as phenol, maleic and phthalic anhydride, formaldehyde and pentaerythritol will be manufactured by RCI to augment its outside purchases.

Inaugurating the program will be a three million dollar expansion of Reichhold's Tuscaloosa, Ala., plant for the production of five million pounds of pentaerythritol (to be produced for the first time by Reichhold) and 30 million pounds of formaldehyde. One of the major uses of the chemicals will be in alkyd resins for surface coating materials.

According to Reichhold researchers, resins made with pentaerythritol possess many resistant qualities that are imparted to their surface coating vehicle, and also, that the use of pentaerythritol would prove to be a stabilizing influence in the cost of such synthetic plastics vehicles.

Such raw material cost stabilization is expected to minimize price advances forecast by present market trends, a company report said.

Plans for expansion work on other Reichhold plants will be announced in the near future, the report stated.

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Northwestern Production Club Secretary Wins E. T. Trigg Award

E. P. Stark, secretary of the Northwestern Paint and Varnish Production Club, has won the 1953 Ernest T. Trigg Award of the Federation of Paint and Varnish Production Clubs.

The award, given to the secretary or member of a Production Club who furnishes the Official Di est the most interesting report of Club meetings and discussions, is made annually in honor of the donor, Ernest T. Trigg, honorary chairman of the Executive Committee of the National Paint Varnish and Lacquer Association.

Honorable mention went to Harry Kelfer, of the New England Club, and Robert W. Lipp, of the CDIC Club.

Operating heads of the various Sherwin-Williams Co., Cleveland, O., plants throughout the country are watching Arthur B. Holton, technical director of Sherwin-Williams, demonstrate the Hunter Color Difference Meter at a recent executive meeting in Cleveland. Left to right, are: Gordon Daly, Montreal, Canada; Aaron Barkman, Chicago; W. W. Gram, Newark, N.J.; W. J. Hancock, Chicago; M. W. Hurdlebrink, Cleveland; Victor Mills, general manager of F. H. Lang, Chicago production, Cleveland; W. C. Currens, Dallas, Tex.; E. W. Fasign, Dayton, O.; C. S. Hollinger, Gibbsboro; W. O. Michaels, Oakland, Calif.; W. A. Miller, Chicago; Mr. Holton; R. F. Schneider, Chicago; J. A. Hutchinson, Detroit; J. R. Ferree, Los Angeles, California, and L. R. Schaeff, Toronto, Canada.

Givaudan-Delawanna's Atlanta Office Moved to Larger Quarters

The Atlanta, Ga., office of Givaudan-Delawanna, Inc., and its associate companies, Givaudan Flavors, Inc., and Sindar Corporation, has recently moved to larger quarters at 1156 Dalon Drive N. E., Atlanta. The telephone number at the new address will be Atwood 0122.

Givaudan-Delawanna has also moved its Detroit office to larger quarters at 18228 Mack Ave. The telephone number at the new address will be Tuxedo 2-8405.

•

Cuno Engineering Corporation Holds Biannual Sales Conference

Product developments, new products and markets, application engineering and trade talks in the field of engineered fluid filtration were among the subjects discussed at the Cuno Engineering Corporation's five-day biannual sales conference held recently at the Sheldon House, Pine Orchard, Conn.

More than 40 United States, Canadian and export representatives participated in the lectures and round table discussions.

Edwin J. Schwanhauser, executive vice president, Worthington Corp., was keynote speaker at the opening day banquet.

He said more vigorous, efficient and professional selling must be done by all industries and then pointed out that all corporate departments such as production, engineering, and advertising must be closely organized to favorably influence the selling factors of price, product and service.

Dr. C. J. Overmeyer Elected Pres. Of Paint & Varnish Prod. Club

Dr. Calvin J. Overmeyer, vice president of the Elliott Paint & Varnish Company, Chicago, Ill., has been elected president of the Federation of Paint and Varnish Production Clubs for 1953-1954.

He succeeds Gustave H. Wescott, whose tenure of office terminated at the close of the Federation's Annual Meeting in Atlantic City, N. J., October 28-31.

Dr. Overmeyer, a past president of the Chicago Paint and Varnish Production Club, has been active in Federation affairs for many years and has headed several Federation committees including: Program, Paint Industries' Show, Meeting, and Joseph J. Mattiello Lecture, as well as having served as a member of the Executive and Finance Committee.

A former Rhodes Scholar, Dr. Overmeyer holds a B. S. degree from Michigan State College, East Lansing, in 1918, and a Doctor of Philosophy degree from Oxford University, England, in 1923.

He began his career in the paint field with the Devoe & Raynolds Company in Boston, Mass.

•

Dec. Pigment Club Meeting To Cover Phtalocyanine Pigments

Dr. Robert E. Brouillard of General Aniline and Film Corp. will present an interesting talk on phthalocyanine pigments at the next meeting of the New York Pigment Club which will be held at the Southern Restaurant 18th St. and Fourth Ave., New York City on December 10th at 6:30 P.M.

Manufacturing Agreement Made By Amer. & U. K Carbon Black Firms

United Carbon Co., Inc., Charleston, W. Va., has announced that arrangements have been made for the manufacture of Furnace Carbon Black in the United Kingdom.

In making the announcement, United Carbon said it had reached an agreement with United Carbon Black, Ltd., Swansea, whereby it would make its technical knowledge and engineering experience available to the United Kingdom firm for the purpose of establishing standards and ensuring control of quality.

•

J. M. Lehmann Company Acquires Interest in Trenton, N. J. Company

J. M. Lehmann Company, Inc., Lyndhurst, N. J., has acquired certain rights, title and interest in the Wm. R. Thropp & Sons Corporation, Trenton, N. J., including manufacturing rights and use of the Thropp Company name.

Thropp & Sons is now a Division of J. M. Lehmann Company. All manufacturing and service facilities for Thropp products will be concentrated at the Lehmann plant in Lyndhurst.

H. F. Croot, Jr., director of sales, and William Wilkes, field service representative, of the former Wm. R. Thropp & Sons Corp., will retain the same titles and responsibilities in the new division.

•

Two Paint Men Honored at Fed. Of Jewish Philanthropies Dinner

Harry Hillman, Eagle Paint & Varnish Co., and Robert I. Wishnick, Witco Chemical Co., were guests of honor at the annual dinner of the Paints & Chemical Division of the Federation of Jewish Philanthropies held December 10, at the Vanderbilt Hotel, New York, N. Y.

The dinner is part of the paint industry's drive to raise funds for the Federation's 116 hospitals and social agencies, which serve more than 575,000 New Yorkers.

Paul L. Kohnstamm, H. Kohnstamm & Co., is chairman of the Federation drive this year. He also served as chairman last year.

Messrs. Hillman and Wishnick were honored at the dinner for their "many years service to the paint industry and its campaigns for the Federation and other communal causes."

Mr. Kohnstamm said the Federation has added 54 new facilities to its 116 hospitals and social welfare institutions at a cost of 33 million dollars to expand the Federation's service to the community.

Other officers of the Federation drive are: honorary vice-chairman, A. E. Horn; co-chairmen, Seymour Meyer and William Wishnick, and treasurer, Monroe H. Sandler.

Members of the Executive Committee are: David A. Ansbacher, Lester Arnstein, Irving Berg, Sam Berg, Sidney Beyer, Abe Chaleff, Robert Cowen, Ben Einhorn, Ephraim J. Faber, Irving Fein, Herman Feinstein, Richard Hillman, Irving Holtz, Joseph Janovic, Louis J. Meyer, Harry Minkoff, Martin Minkoff, Samuel Offerman, Leo J. Roon, Edward Rose, Casper Smith, Rudolph G. Sonneborn, Philip S. Tashman, Henry Walker, Beatrice Weiner, and Louis J. Woolf.

Heading the Executive Division for the Federation are James L. Weil and Henry Sonneborn III.

•

Chemical Specialties Mfrs. Assn. Schedules Annual Meeting Dec. 7-8

Undercoats, lacquers and synthetic enamels for automotive finishes will be among the subjects covered at the 40th Annual Meeting of the Chemical Specialties Manufacturers Association scheduled December 7-8, at the Hotel Mayflower, Washington, D. C.

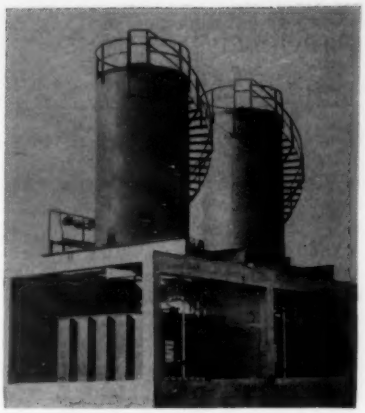
The program will also include a survey report of retailers' reaction to aerosols emulsion stability testing and the final portion of a laboratory report on the need for waxing vinyl floors.

•

Cuno Appoints Towner Company Sales Rep. for Cleveland Area

The Cuno Engineering Corporation, Meriden, Conn., has appointed the V. L. Towner Company industrial sales representative of its Cleveland District. The Cleveland territory includes northern Ohio.

Mr. Towner, head of the Towner Company, had been assistant general manager of the George P. Dempler Company in Pittsburgh, selling Cuno industrial filters and related products



Alcohol denaturing plant near Chicago, which Shell Chemical Corp., New York, N. Y., has just started operating. According to a company report, plant will substantially reduce the time required by Shell to service orders from Mid-Western points. The plant is an addition to the storage and distribution facilities that the company has been using at Argo, Ill. Shell is also expanding its alcohol denaturing plant at Sewarne, New Jersey.

•

Recently Formed Ohio Company To Produce Sirconium Compounds

Formation of the Zirconium Corporation of America, Solon, Ohio, has been announced by George R. Sylvester, president.

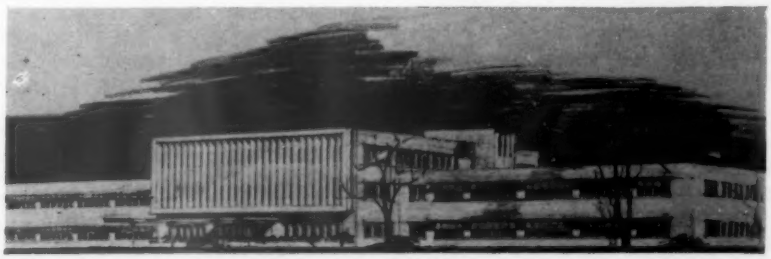
The new corporation plans to manufacture various zirconium compounds but will concentrate on production of zirconium oxide.

The patented process to be used by Zirconium was developed by Sylvester & Company, Cleveland engineering firm, under the direction of Dr. Robert A. Schoenlaub. A pilot plant was successfully run for over a year producing stabilized zirconium oxide, according to a company release.

Officers of the corporation are: Dr. Robert A. Schoenlaub, vice president; Guthrie Bicknell, vice president; and Norton V. Coyle, secretary.

Present plans call for full-scale production at the new Solon plant by January 1954. General offices are located in the Solon Center Building, Solon.

How the Atlas Powder Company's new administration building in Wilmington, Del. will look. Construction on the $2,700,000 building, which will house the firm's present 400 general office employees, plus space for a 50 percent future staff expansion, began November 25.



PRODUCTION CLUB NEWS

(From page 30)

were pointed out with the aid of slides. A series of panels and coatings on various surfaces were made available for inspection to demonstrate the flexibility, chemical resistance, adhesion, etc. of the cured films.

The next speaker was Dr. Harold Wittcoff of General Mills, who discussed "Curing Agents for Epoxy Resins." The results of the work showed that cured films of epoxy resins have outstanding properties. The inclusion of Polyamide resins as curing agents presented a report which had not been previously made. The paper contained so much information that it could not properly be condensed and included in the minutes. An abstract was made available to each member present for reference.

The meeting was then turned over for open forum discussion with Max Kantor as moderator. A tape recording was made of the proceedings. Harry Howard, of the Shell Chemical Company, was present as a guest and numerous questions were addressed to him and to Dr. Wittcoff on various phases of properties of cured epoxy films, as well as problems of availability and the future plans of the industry. It was stated that a number of concerns are now either in production or planning to get into production of epoxy resins and some thirty million pounds are scheduled for 1954.

The November meeting was held on the 6th, at the Town & Country Club, St. Paul, Minn.

John Rouse, chairman of the 1953 technical committee, announced that its paper on "Curing Agents for Epoxy Resins" had won first prize at the convention.

Committees appointed for the 1954 year are: Program, E. P. Stark, chairman, Phil La Peau and Dave Glaser; Membership, Larry Spilde, chairman, L. F. Wood and Max Kantor; Open Forum, Jim Porter, chairman, F. J. Moore, Jr., F. Parkin and Leroy Severson; Nominating, Ed Erickson, chairman, Dave Glaser and R. W. Brown; Methods of Test, Russ Johnson, chairman, John Erickson, M. A. Peterson, David Atlas and N. A. Albertsma; 1955 Technical, Dick Radford, chairman, Floyd Nelson, Robert M. Barry and H. K. Henning; By Laws, Ed Carlson and M. C. Hilke.

F. D. Steig, Titanium Pigment Corporation, and speaker of the evening, discussed, "The Effect of Pigmentation Variation on Modern Flat Wall Paints.

Los Angeles

The October meeting was held on the 28th, at Scully's Restaurant.

Chairman for the 1953-1954 year were appointed. They are: Technical, Roswell J. Blackinton; Membership, Robert L. Vignola; Good Fellowship, Earl Hanson; Spring Frolic, Wilber Johnson; Standards and Methods of Tests, Joe Weber; Publicity, Ernie Ansley and Eddie Vaught; Educational, Ed Campell and Clyde Smith; Constitution & By-Laws, Dick Savage and John K. Bice; Meetings, Ed Taylor, W. A. Gerhardt; Audit & Budget, Frank H. Martin; Joint Co-ordinating, Leo Forth, Jr., and Clyde Smith; Employment, Estol Boehme; Health and Safety, Robert Yates; Program, W. Vern Barrett; Summer Party, Al Abshire and Jim W. Gilman, and Golf Toronto Trophy, Bert E. Martin.

Herman Phillips, Hercules Powder Company, was speaker of the evening. With the aid of a trailer, members and guests viewed the modern technique of hot spraying of lacquers and aerosol lacquers. An airless atomization technique was also displayed.

Mr. Phillips' talk included a discussion of developments of lacquers for military use, such as coatings for tanks, shells, etc.

The November meeting was held on the 11th, at Scully's Restaurant.

Charles O'Conner, president of Reichhold Chemicals, Inc., was guest of honor and featured speaker. He presented a color movie of one of his many trips to the Orient.

Speaker of the evening, Fred Greenawald, chief of the Protective Coatings Laboratory, Nuodex Products Company, discussed metallic driers. He outlined a brief history of driers from the initial use of litharge and umber one hundred years ago to the present, where four or five main metallic soaps are used as driers.

Comparing the various metals used to-date, Mr. Greenawald said that lead, cobalt, calcium and manganese were the most superior metals used for driers, and he cautioned, that use of any other metals must be evaluated carefully in the light of the many factors looked for in a good coating, in addition to economy.

Louisville

Fifty-two members attended the October meeting at the Seelbach Hotel, Louisville, Ky.

Peyton Wheeler, Edgar Brothers, presented a paper on, "The Use of Aluminum Silicates in Coatings."

The geological formation, mining and preparation of the product were described. According to Mr. Wheeler, there may be 75-100 ft. of over burden to be removed from the deposit, as mined particle sizes run from 0.1 to 75 microns. Thickness of the particle is 1/12 of other dimensions.

Mr. Wheeler explained particle properties, methods of classifying and purifying. He said a 2 micron particle imparts gloss to paper and that heat resistance and effect on sheen are useful in paint formulations.

Slides were used to illustrate the various properties of the product.

The November meeting was also held at the Seelbach Hotel.

F. B. Stieg, Titanium Pigment Corp., was guest speaker. His topic was, "The Effect of Pigmentation on Modern Flat Wall Paints."

He discussed the effect of solvent on the vehicle and the need for using the critical pigment concentration and the methods of determing this value.

Mr. Stieg compared the performance of R.C.H.T., C-50 and pure titanium dioxide.

Charts, graphs and colored slides showed results obtained with these coatings.

•

Devoe & Raynolds Honored by The Hundred Year Association

Devoe & Raynolds Company, Inc., New York, N. Y., "The First American Paint Maker," was honored at the 21st Annual Dinner of the The Hundred Year Association, Inc., held October 28, at the Waldorf-Astoria Hotel, New York, N. Y.

A plaque, "in recognition of distinguished service in the City of New York for 200 years," was presented to George H. Fitch of Devoe & Raynolds, by Charles B. Delafield, President of The Hundred Year Association.

The HYA was organized, "To record the founding and development of such business establishments as have been continously conducted in New York City for a period of a century or more."

•

J. K. Wise Elected Chairman of Amer. Chem. Society's Paint Div.

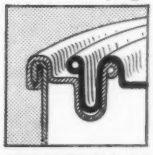
John K. Wise, assistant director of research of the United States Gypsum Company, Chicago, has been elected 1954 chairman of the American Chemical Society's Division of Paint, Plastics and Printing Ink Chemistry. He succeeds Arthur K. Doolittle, assistant research director of the Carbide and Carbon Chemicals Company, South Charleston, W. Va.

Dr. A. C. Zettlemoyer, professor of physical chemistry and research director at Lehigh University, has been named chairman-elect; Russell Akin, Chicago district sales manager in the Polychemicals Department of du Pont, vice-chairman; and Dr. Allen L. Alexander, head of the Protective Coatings Branch of the Naval Research Laboratory, Washington, D. C., secretary-treasurer.

Mr. Wise is a member of the Federation of Paint and Varnish Production Clubs.

WE KNOW WHAT IT MEANS

When a customer says "Pronto" to us — we really get on the ball and get his cans rolling to him. Fast delivery is one of the most important features of Continental's Tailor-Made Service.



"TRIPLETITE" lid binds metal to metal at 3 points — provides 50% better protection!

You get the best in containers, too. Our "Tripletite" paint cans provide a 50% increase in guard points against oxidation and formation of wasteful messy paint skin. In lid and lid seat, metal meets metal at three points instead of the usual two.

We certainly would like to have you give Continental service a try. Just give us a call and you'll see what it means to you!

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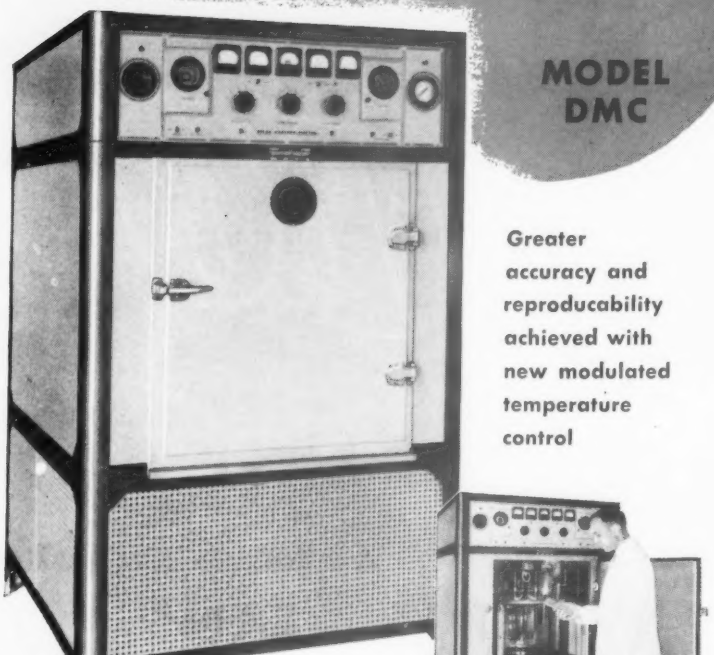
EASTERN DIVISION: 100 E. 42nd ST., NEW YORK 17

CENTRAL DIVISION: 135 SO. LA SALLE ST., CHICAGO 3

PACIFIC DIVISION: RUSS BUILDING, SAN FRANCISCO 4

A NEW Weather-Ometer® BY ATLAS...

MODEL DMC



Greater accuracy and reproducability achieved with new modulated temperature control

Accuracy in test results is greatly increased in the new DMC Weather-Ometer by a positive control of specimen temperatures.

A constant volume of air at a controlled temperature in the heavily insulated cabinet, maintains uniform predetermined specimen temperatures regardless of variations in room conditions.

Automatic control of humidities up to dew point is available as optional equipment.

All automatic controls including complete voltage controls are located on the front panel of the Weather-Ometer directly above the door of the test chamber.

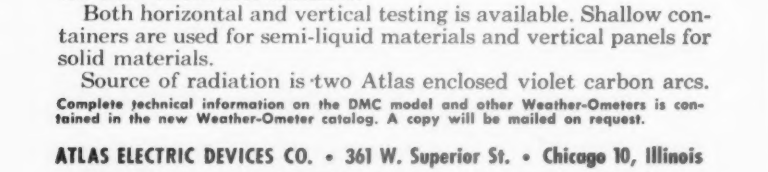
Both horizontal and vertical testing is available. Shallow containers are used for semi-liquid materials and vertical panels for solid materials.

Source of radiation is two Atlas enclosed violet carbon arcs.

Complete technical information on the DMC model and other Weather-Ometers is contained in the new Weather-Ometer catalog. A copy will be mailed on request.

ATLAS ELECTRIC DEVICES CO. • 361 W. Superior St. • Chicago 10, Illinois

Manufacturers of accelerated testing equipment for over a quarter of a century



WEATHER-OMETERS • FADE-OMETERS • LAUNDER-OMETERS

NEWS DIGEST

New York Paint Production Club Technical Comm. Holds Meeting

The Technical Committee of the New York Paint and Varnish Production Club held its first meeting under its newly elected officers, November 19, at the Brass Rail restaurant, New York, N.Y.

The men and committees who presented the club papers at the Convention were congratulated for receiving the following prizes: Sub-Committee No. 40, E. J. Dunn, Jr., Methods of Measuring Dry Hiding of Paints—2nd Prize; Sub-Committee No. 44, Fred Steig, Emulsion Paints—3rd Prize. Mr. Dunn also received 2nd Prize for presentation.

S. R. Mountsier, Jr., of Whittaker, Clarke & Daniels, presented his report on the meeting of the Federation Corrosion Committee, which was held during the Convention in Atlantic City. He said a scholarship grant was to be requested by the committee to be used to study rust inhibition at some university. Mr. Mountsier also reported that the New York Club was asked to evaluate and improve film thickness gauges for use on all types and shapes of steel structures.

Royal Brown then presented a number of possible problems that could be studied by one or more Industrial Finishes and Lacquers Committees: effect of film thickness on mechanical properties; factors effecting discoloration such as ultraviolet and sunlight; factors affecting lifting when recoating; study of solvent retention; development of accelerated durability tests, which are more reliable than the Salt Fog, Humidity and similar tests in use at the present time.

The Technical Committee held another meeting December 10, at the Brass Rail, New York, N. Y.

•

Chicago Firm Expands Coverage of Georgia Marble's Calcium Products

The Calcium Products Division of The Georgia Marble Company, Tate, Ga., has announced that the C. P. Hall Co. of Chicago, Ill., will expand its coverage of their products to include the paint, plastic, paper and polyester field.

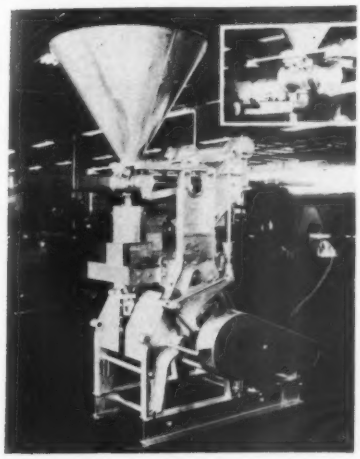
Hall will warehouse stocks of wet-ground and dry-ground calcium carbonates produced by Calcium Products.

In addition the Hall Company will market talcs, mica, clays, defoamers, esters, plasticizers, etc.

NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is to keep readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



FILLER

FILLING MACHINE
For Putty and Caulking Materials

Heavy duty semi-automatic filling machine fills products up to the viscosity of putty, claims the manufacturer. This unit is said to fill all size tubes, cans and glass with such products as glazing putty, caulking compounds, etc. The machine will fill gallon cans with only one stroke of the plunger. The Filler Machine Co., Inc., Philmont Club Station, Pa.

AMYL ACETATE
For Blush Resistance

Amyl Acetate 280 is used in solvent systems containing acetone to produce a low cost lacquer thinner that does not blush at relative humidity of 65-69 percent at 90 deg. F. Other features claimed for this solvent include: uniform composition, compatibility with most lacquer resins, works well with ketones and aliphatic diluents, and reduces orange peel. Sharples Chemicals Inc., Subsidiary of Pennsylvania Salt Manufacturing Co., Philadelphia, Pa.

LABORATORY STIRRER
Magnetic Type

Laboratory stirrer is designed as an answer to the space problem found in many laboratory bench assemblies, especially in the close quarters of organic syntheses. Known as "Flexa-Mix", this stirring unit is claimed to have the following features: no arms to get in the way, no loose holders to flop around, low height, and sturdy cast-iron base plate with integral clamp is included with each stirrer. This plate makes possible a wide variety of positions and tilts, distance from the center of the plate to the assembly rod is 4½ inches and conforms to laboratory standards which permits quick alignment of all units of apparatus and glassware in an assembly. Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.

FISHER

ALUMINUM OCTOATE
Controls Bodying

"Nuogel A.O." is recommended for controlling the bodying of pigment vehicle systems in paints and inks, and in paint and varnish removers, according to the manufacturer. Nuogel A. O. is a high quality aluminum octoate. Nuodex Products Co., Inc., Elizabeth (F) N. J.

ODORLESS DRIERS
Naphthenate Types

Naphthenate type cobalt and lead driers can be used in odorless formulations with assurance of imparting no odor to finished products, yet with metal concentrations and drying power comparable with company's standard line, the manufacturer claims. For complete details regarding these odorless driers, contact Witco Chemical Co., 260 Madison Ave., New York 16, N. Y.

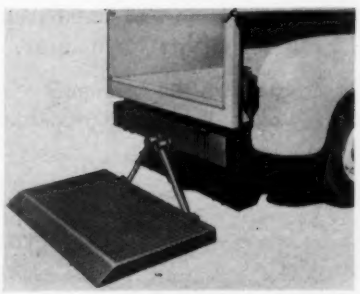
EPOXY ESTER
May Be Used With Amino Resins

Epon Ester YS-5 is a soy ester of Epon 1007. Characteristics claimed by the producer include good color and color retention, good hardness and adhesion, and good flexibility and distensibility. It can be used in air drying or baking systems and is well suited to modification with melamine or urea resins. Shell Chemical Corp., 500 Fifth Ave., New York 36, N. Y.

LIFT TAIL GATE
1000 Lb. Capacity

Hydraulic lift tail gate is for ½, ¾ and 1 ton trucks of pick-up, stake or platform body styles and has a capacity of 1000 pounds. Unit helps to prevent injury, saves labor costs by allowing one man to operate a truck and handle loads that would ordinarily require the services of two men. Automotive Div., Master Vibrator Co., P.O. Box 657, Dayton 1, Ohio.

MASTER



DOW IN FULL PRODUCTION NOW AT NEW VINYLTOLUENE PLANT!

Production of high-quality monomer in instrument-controlled plant stepped-up from developmental quantities to full-scale production

With the announcement of full-scale operation of Dow's new vinyltoluene plant in Midland, Michigan, Dow marks another "first" in monomer production. The above photograph of the central control instrument panel will provide some indication of the engineering standards that prevail throughout the plant to assure you of a reliable and uninterrupted source of consistently top quality vinyltoluene.

Priced to match the economies of styrene, Dow Vinyltoluene offers many new properties of special interest to members of the resin industry working with rubber reinforcing resins, styrenated oils and alkyds, styrene butadiene copolymers and polyester resins.

The experience of Dow's technical service staff will be of substantial assistance in your developmental work to determine the advantages that Dow Vinyltoluene can contribute to your product. For further details and information regarding properties of vinyltoluene, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales, PL 1357 E

you can depend on DOW CHEMICALS

DOW

NEW MATERIALS — EQUIPMENT

LEXUSCO

DRUM HANDLING DEVICES
Three Types

Up-Ender—for tilting and upending of drums on docks, platforms, trucks and elevators, at plants or job sites.

Drum Lifter—has "off-center" design and positive locking jaws; has found application in a wide variety of drum lifting, stacking and loading operations. May be used for 20, 30, and 55 gallon drums; used in conjunction with a chain fall, hoist, lift truck or crane.

Drum Dolly—Can be used for drums up to 24 inches in diameter. According to the manufacturer, rugged welded steel cross members, a five inch safety rim, and balanced design prevent loads from tipping. Four ball bearing casters allow workmen to move the heaviest loads with little physical exertion. Write Lexsuco, Inc., 4815 Lexington Ave., Cleveland, Ohio.

CAPACITANCE GAUGE
Varied Uses

Proximity meter-capacitance gauge may be uses to measure concentricity, as micrometer to measure small dimensions, as dielectric comparator, and to measure thickness of paint or insulating materials bonded to metal surfaces. For complete details write to Fielden Instrument Div., Robertshaw-Fulton Controls Co., 2920 North 4th St., Philadelphia, Pa.

MELAMINE RESIN
Improved Alkyd Compatibility

Plaskon 3382 is intended for use in highest grade baking enamels in conjunction with a wide range of alkyd resins, according to the manufacturer. Characteristics claimed for this resin are good "flow" and "build", freedom from pits and craters, rapid rate of cure, improved alkyd compatibility, improved resistance to soaps, detergents, solvents and household staining agents. Uses include automotive enamels, venetian blind finishes, washing machine and refrigerator enamels, and general purpose enamels. Plaskon Products, Barrett Div., Allied Chemical & Dye Corp., Toledo 6, Ohio.

POLYMERIZED LINSEED OIL
Has Good Wetting Properties

Norlin L-70 is a polymerized linseed oil produced by a low temperature catalytic process. According to the producer, this oil has good pigment wetting properties which promote excellent flow and leveling. It is reported that the polymer structure built up in the processing results in an oil with good non-penetrating properties and drying characteristics. Suggested use of this bodied oil is in one-coat exterior house paint formulations where elimination of brush marks and controlled penetration are of particular interest. Cargill, Inc., Vegetable Oil Div., P.O. Box 1075, Pittsburgh 30, Pa.

NOW You Can Stop Pressure Build-Up in Aluminum Paints With SYLOID® AL-1

Tests conducted by the Aluminum Research Laboratories of Aluminum Company of America ". . . indicate that SYLOID AL-1, when used in concentrations up to 1% based on total weight of paint, effectively retards pressure development in ready-mixed varnish base aluminum paint containing moisture in concentrations up to 0.5%."

This problem of pressure build-up in ready-mixed aluminum paints has long been a serious one. Now this pressure development can be stopped. The leaf stability of the paint is not affected and the drying rate is not retarded.

For complete information on SYLOID AL-1, including results reported by Aluminum Research Laboratories, write

Progress through Chemistry

THE DAVISON CHEMICAL CORPORATION

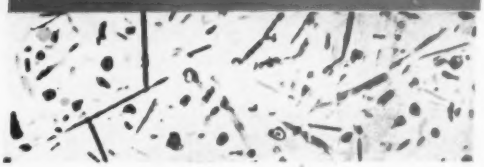
Baltimore 3, Maryland

PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, AND SILICOFLUORIDES. SOLE PRODUCERS OF DAVCO® GRANULATED FERTILIZERS.

high

AZO ZZZ-22

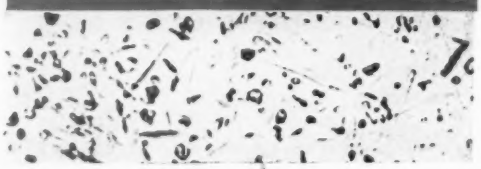
A high oil absorption Zinc Oxide having large Acicular Particles which gives heavy body



medium

AZO ZZZ-11

A medium oil absorption Acicular Zinc Oxide imparting exceptional weathering qualities to exterior paints

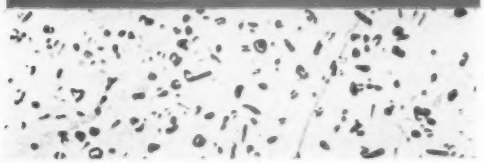


AZO acicular lead-free zinc oxide is a superior pigment available in a wide range of oil absorptions

low

AZO ZZZ-33

A definitely Acicular type with a lower oil absorption, but chemically identical with AZO ZZZ-11 and AZO ZZZ-22



AMERICAN ZINC SALES COMPANY
distributors for
AMERICAN ZINC, LEAD & SMELTING COMPANY
COLUMBUS, OHIO • CHICAGO • ST. LOUIS • NEW YORK

AZO

UNIFORM • DEPENDABLE

NEW MATERIALS — EQUIPMENT

CHARLES ROSS

FLOATING ROLL MILL
With 2 point Adjustment

Three roll mill (#52TF) offers greater ease in properly setting rolls, and less skill or experience is required by the operator, according to the manufacturer. It is also claimed that this mill gives greater production, and settings on special pressure gauges can be recorded for reproducing the same material on repetitive runs.

Features include hydraulic adjustment of rolls; front adjustment which permits operator to clean down apron or to check delivery roll for proper grind and takeoff, while adjusting the handwheels and gauges at front of mill.

For cleaning the mill, the operator merely turns free moving handwheels in the opposite direction until gauges record zero pressure and rolls are separated by special high compression springs. For premixing when desired, between back and middle rolls, there is a device for disengaging the front roll. When premix is completed, the device is released and the middle roll adjusts to front roll for finish grind and takeoff. Charles Ross & Son Co., 148-156 Classon Ave., Brooklyn 5. N. Y.

VINYL ACETATE LATEX
For Sealers and Flats

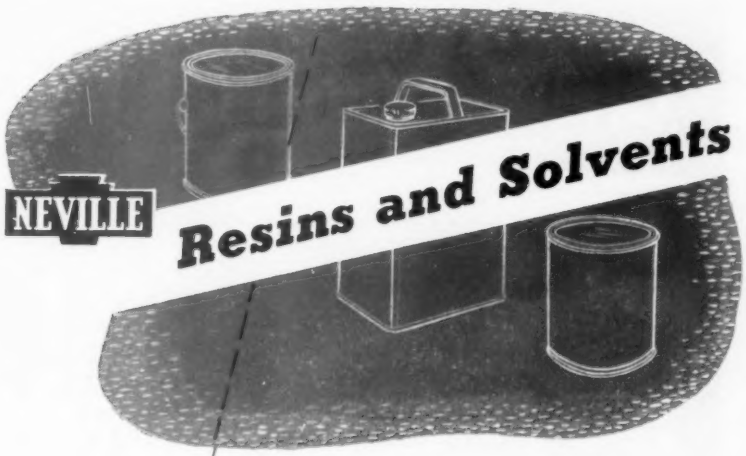
Vinyl acetate resin latex WC-130 is said to be a rapid-drying latex giving a non-re-emulsifiable film that has all the properties necessary for use as a vehicle in both sealer-coater and interior wall finish formulations. Available as 55 to 58 percent non-volatile water dispersion having a specific gravity of 1.11 and a pH of 4.5 to 5.5.

The manufacturer reports that under ordinary conditions WC-130 does not require the use of plasticizers to form a continuous film; however, 10 to 15 per cent plasticizer, based on the resin weight, may be added to increase film flexibility, decrease surface haze, and improve cold weather fusion. This resin is supplied in an unmodified form to permit the widest modification with pigments, fillers, plasticizers, thickeners, and wetting agents.

Properties claimed by the manufacturer in sealer-coaters and interior finishes are as follows:

In sealer-coaters for "hot" plaster, wood, wallboard, concrete, cement block, and other porous surfaces, WC-130 has excellent pore-filling qualities, gum and pitch resistance, oil resistance, and acid and alkali resistance, It can also be used directly over asphalt surfaces to prevent "bleeding."

Wall paint formulations using WC-130 as a vehicle show exceptional brushability and flow-out, and give grease and scrub-resistant films with good adhesion. Paints based on this resin have good mechanical stability, pigmentation stability, and storage stability. For complete details including formulations and manufacturing procedures, write to Bakelite Co., Div. of Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.



for making **better** paints and varnishes

Neville has kept pace with the industry's progress by continually developing and improving processes and products. The result . . . you can always depend upon Neville Resins and Solvents in making modern, quality paints and varnishes to meet today's ever increasing commercial and industrial demands!

Coumarone & Petroleum Resins
Oxidizing Petroleum Resins
Resin Solutions
Aromatic Solvents
Anti-Skinning Agents
Shingle Stain Oils
Navy Specification Coal-Tar

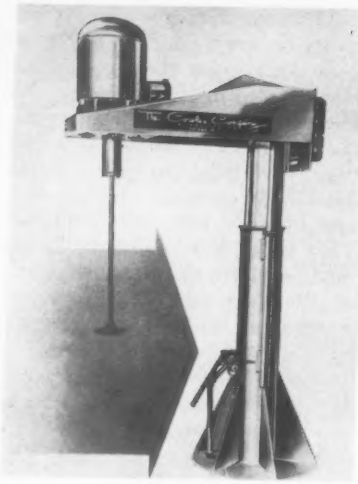
NEVILLE CHEMICAL CO.
PITTSBURGH 25, PA.
Plants at Neville Island, Pa., and Anaheim, Cal.

P-52

NEW MATERIALS — EQUIPMENT

DISSOLVER
3 Hydraulic Lifts

"Ultrafast Dissolver" is available with three different types of hydraulic lifting equipment: water, air, or oil for raising the impeller and bridge clear of mixing tanks. The manufacturer claims that this lift makes it possible to process several materials with the same machine. Standard hydraulic equipment on this particular dissolver is the water lift. For those who do not have available water supply with an operating pressure of 35-60 psi, two alternatives are available to them:



COWLES

compressed air over oil, and an auxiliary pump that operates a direct oil hydraulic lift. This dissolver is manufactured in several basic models, through standard interchangeable parts, it is possible to create an unlimited number of special high speed dissolving machines through combinations of many different components. The Cowles Co., Inc., Cayuga, N. Y.

PHENOLIC RESINS
Wide Compatibility

Known as 75120 and 75121 Methylon resins, this line of phenolics is said to impart outstanding chemical resistance to protective coatings and are capable of producing coatings that are especially resistant to corrosive and oxidizing agents.

G-E 75121 resin is compatible with medium to short alkyd resins, polyvinyl butyral resins, melamine resins, epoxy resins and other coating resins. It is soluble in conventional solvents, such as xylol, toluol, diacetone alcohol and methyl ethyl ketone.

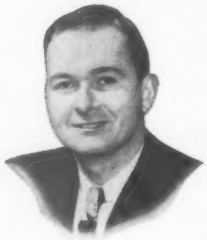
Potential uses for these resins include container linings for drums, cans, pails; specialized industrial coatings for photographic tanks, chemical processing equipment, and air-conditioning units; primers requiring special resistance properties, and general chemical resistant coatings. For full details contact Chemical Materials Dept., General Electric Co., 1 River Road, (Building #77), Schenectady 5, N. Y.

VINYL ACETATE EMULSIONS
For Fast Drying Sealers

Vinac XX, a polyvinyl acetate emulsion, is recommended as a base for primer-sealers and undercoaters, interior and exterior coatings. According to the manufacturer, coatings formulated with this particular emulsion have the following properties: resistance to oxidation, sunlight, alkalis, and oils; forms tough pliable films which has good adhesion to a variety of surfaces; primer sealers compounded with this material are fast-drying and may be used over stucco, concrete, plaster, cinder block and gypsum wallboard with good hold out properties. For complete details contact the Colton Chemical Co., 1545 E. 18th St., Cleveland 14, Ohio.

Chats about Finishes

ETHYL CELLULOSE LACQUERS—SOLUTION FOR MANY PROBLEMS



by

CLARENCE W. GAULT

Manager of

Ethyl Cellulose Sales

Hercules' Cellulose Products Dept.

If you have a particularly tough lacquer problem, the unique properties of ethyl cellulose may hold the key to its solution. Ethyl cellulose is used on widely different surfaces including plastics such as polystyrene, and on rubber, metal, wood, and paper. It also forms the base of many liquid adhesives, strippable protective coatings, and gel lacquers.

Our extensive research on ethyl cellulose coatings has given us valuable data that may help you find the answer to your problem. We also have available a new technical booklet about ethyl cellulose specialty lacquers. Write me and I'll be glad to send you the booklet or give you information about specific problems that have been solved using ethyl cellulose.

Clarence W. Gault

Cellulose Products Department

HERCULES POWDER COMPANY

INCORPORATED

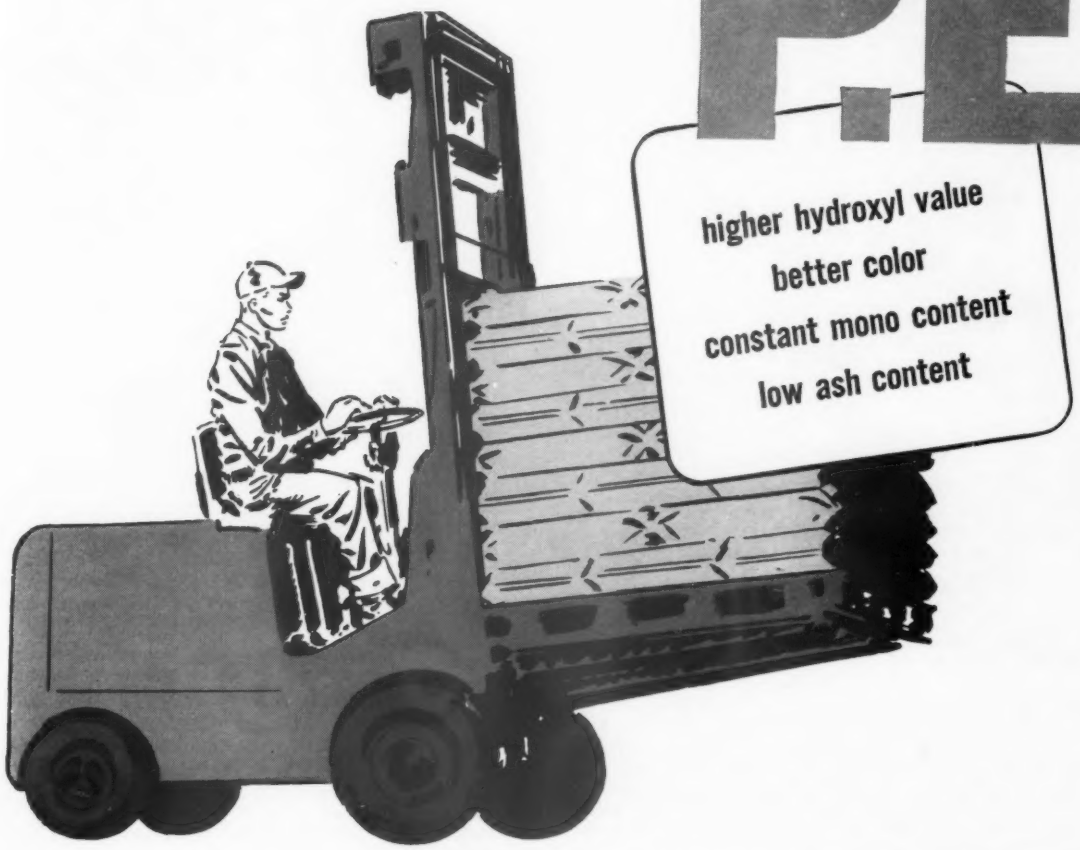
926 Market Street, Wilmington 99, Del.

1053-7

When you buy pentaerythritol

make the advantage **Decisive**

. . . specify Celanese* **P.E.**



Manufacturers know the advantages of pentaerythritol in alkyd resin production: more rapid bodying . . . superior gloss and gloss retention . . . greater hardness . . . water, alkali and weathering resistance.

Now, many are finding that Celanese P. E. assures them a new high level of purity and uniformity—the result of a continuous production process using Celanese Formaldehyde and Acetaldehyde. They're discovering ingredient savings through its higher hydroxyl value. Its lower color rating saves on white pigment. The problems of filtering and frothing during cooking are minimized.

These manufacturers are benefiting from the handling efficiency of palletized unit-ton shipments . . . the convenience of bulk stocks warehoused in Newark (N. J.), San Francisco, Chicago, Los Angeles and Oakland . . . as well as the extra economy of mixed carloads of Celanese P. E., Paraformaldehyde, and Glycols.

The Alkyd Resin Group of the Celanese Technical Service and Application Laboratories is prepared to assist you in making complete formulations, tests and cost analyses.

Celanese* CHEMICALS

*Reg. U. S. Pat. Off.

CELANESE CORPORATION OF AMERICA • CHEMICAL DIVISION • 180 MADISON AVENUE • NEW YORK 16, N. Y.

Personnel Changes

WYANDOTTE

Dr. William F. Waldeck has been promoted to Director of Research and Development, succeeding Dr. Thomas H. Vaughn, who has joined Colgate-Palmolive-Peet, as vice president in charge of research and development. Dr. Waldeck joined Wyandotte in 1939, after being associated with the Columbia Chemical Division of Pittsburgh Plate Glass Company, where he was acting director of research. Most recently he was Director of Research and Development at Wyandotte.

SAPOLIN PAINTS

Scott Barlow has been named assistant ad manager. He was formerly ad manager of the International Division, Carrier Corp.

ROHM & HAAS

Dr. F. Otto Haas has been elected Executive Vice President. He joined Rohm & Haas in 1939 as a research chemist. Mr. Haas has been a director of the company since 1948. He was named a vice president and member of the Executive Committee of the Board of Directors in 1951.

BURNS & HART

Clem Einbecker, a paint formulator and production supervisor for the past 20 years, has been added to the Research staff of Hart & Burns, Inc.

R. T. Urich

L. Drake

REICHHOLD CHEMICALS

Ralph T. Urich has been named general manager of the company's New England Division with headquarters in Ballardvale, Mass. He was formerly sales manager of the Color Division. Before being named to the Color Division in 1944, Mr. Urich did sales and research work in inorganic colors both with Reichhold and The United Color & Pigment Co.

Lloyd Drake has been named sales manager of the firm's Chemical Color Division, with headquarters in White Plains, N. Y. He has been with Reichhold since 1948 as a sales representative, and has been associated, in production and sales capacities, with the dry color industry for 18 years.

R-B-H DISPERSIONS

R. Marsh Steiding has been appointed to the sales staff and will represent the firm in the New Jersey, Pennsylvania, Delaware, Maryland area, as well as in the eastern part of the Southern states. He joined R-B-H as a sales trainee. He was previously associated with Monsanto Chemical Company in Everett, Mass. Mr. Steiding replaces **Donald F. Farnsworth,** who has been named Assistant Advertising Manager. Mr. Farnsworth will handle sales correspondence and exports.

PENNA. INDUSTRIAL CHEM.

Gardner L. Brown has been named sales engineer by Pennsylvania Industrial Chemical Corporation. Before joining Pennsylvania Industrial Chemical, Mr. Brown was associated with the Goodyear Tire & Rubber Company where he served for ten years in Rubber Reclaim Development. He also served Goodyear in the compounding and processing sections and with the Goodyear Atomic Corporation. He is a member of the American Chemical Society and The Akron Rubber Group.

G. L. Brown

COLOR was "dragged" into the picture!

Polychrome picture of bison from cave at Altamira, Spain.

WHILE the exact circumstances surrounding the first discovery and the use of paint are shrouded in the mist of distant yesterdays, the urge to make use of color is inherent in primitive man. It may have happened when a lonely paleolithic artist—prompted by another urge—seized his neighbor's daughter by the hair and dragged her to his cave. Upon noting the yellow and red clay which had accumulated on his bride's deerskin sarong in the course of her bumpy journey, he promptly used the colorful material to embellish the walls of his cave.

An estimated 100 thousand years later, in 1879, the Marquis de Sautuola—an amateur archeologist—decided to explore a cave on his estate in Cantabria, Spain. Accompanied by his small daughter he dug around the cave's vestibule looking for stone implements. The little girl entered a low passage holding a candle. Happening to look up, she caught sight of the bisons in that now famous, polychrome frieze and called out, "Toros! Toros!" Thus were the famous Altamira frescos discovered and, with them, the first known use of color—in the form of mineral oxides—as a medium for artistic expression.

ST. JOSEPH LEAD COMPANY
250 PARK AVENUE, NEW YORK CITY 17
Plant & Laboratory: Monaca (Josephtown) Pa.

THIS IS NUMBER 2 OF A SERIES

Paint is used for one or more of four purposes: for *decoration*, for the *protection* of structural materials, for *sanitation*, and for obtaining better *distribution of light or greater visibility* of an object. These functions of paint were discovered in the order named, and all of these will be treated in succeeding advertisements.

ZnO—ONE OF THE PAINT INDUSTRY'S ESSENTIALS

VELSICOL RESINS

AD·4
AD·21

For High Quality, Low Cost Metal Coating Finishes

Velsicol Resins AD-4 and AD-21 are especially suitable for use in air dry or baking oleoresinous metal coating vehicles. They impart excellent quality and economy to protective and decorative metal coating finishes. Among the many applications are coatings for drums, pails, cans, auto chassis, auto parts, coil springs, and trays. These resins are neutral and non-saponifiable. They are chemically resistant to water, aqueous acids, alkalis, and many other materials, these resistance properties being imparted to coatings. They possess excellent film forming properties, and can be formulated to provide hard, flexible resistant, and adherent films. For further information, write to the Velsicol Corporation Technical Department.

OTHER SUGGESTED APPLICATIONS FOR VELSICOL RESINS

- Floor and trim vehicles.
- General utility varnishes.
- Traffic paints.
- Extenders for 100% oil soluble phenolic resins.
- Extenders for Chlorinated rubber.
- Grinding liquids.
- Aluminum paints.

PROPERTIES

- Low degree of solvent retentivity.
- Non-acidic.
- Non-saponifiable.
- Coatings resistant to water, aqueous acids and alkalis.
- Soluble in aliphatic and aromatic naphthas.
- Compatible with vegetable and marine drying oils.
- Vehicle films are hard, flexible and adherent.
- Resin solutions promote excellent leafing and flooding of aluminum pigment.

VELSICOL CORPORATION

General Offices and Laboratories
330 East Grand Avenue, Chicago 11, Illinois

Export Division
100 East 42nd Street, New York 17, New York

REPRESENTATIVES IN PRINCIPAL CITIES

PETROLEUM DERIVED CHEMICALS
VELSICOL
SERVING BASIC INDUSTRIES

GLIDDEN

George S. Forbes has been appointed regional director of the firm's Central Region. In his new capacity, Mr. Forbes will be responsible for research, manufacturing and industrial and trade sales in Ohio, Western Pennylvania and New York, Michigan, Indiana and West Virginia. His headquarters will be in Cleveland. He formerly served as the company's central region industrial sales manager. Mr. Forbes joined Glidden in 1939.

G. S. Forbes

Albert J. Waldron, Jr., has been named industrial sales manager of the firm's Central Industrial Region. He will direct and coordinate all Glidden industrial sales in that area. Mr. Waldron joined Glidden in 1941.

CONSOLIDATED CHEM.

J. C. Crowder has been appointed general superintendent of the firm's Southern Division. Since 1940, he had been manager of Consolidated Chemical's Fort Worth, Texas, plant. He joined the firm in 1927, as an engineer in the Baton Rouge, La., plant.

EAGLE-PICHER

John W. Kenney, Jr., has been named plant manager of all the firm's Diatomaceous Earth Operations at Clark, Nevada. He succeeds Thomas A. Copeland who resigned to devote his full time to private interests.

PENNSALT

Joseph P. Stanavage has joined the Research and Development Division He will work on corrosion engineering projects. Mr. Stanavage was formerly with the General Chemical Division of Allied Chemical & Dye Corporation.

M. C. Vaughan

M. D. Vaccaro

WITCO

Melville C. Vaughan has been promoted from salesman to sales manager. He joined Witco in 1932 as a chemist in the New York laboratory and was transferred to the Cleveland sales force in 1947. Mr. Vaughan belongs to the Cleveland Paint Production Club.

John H. Wishnick, formerly superintendent of the Witco Chemical Company's Chicago plant, has been named vice president in charge of Production and transferred to Witco's headquarters in New York, N. Y. He became superintendent at Chicago in 1952, having served two years as manager of Continental Carbon Company's Oil Black Division at Westlake, La.

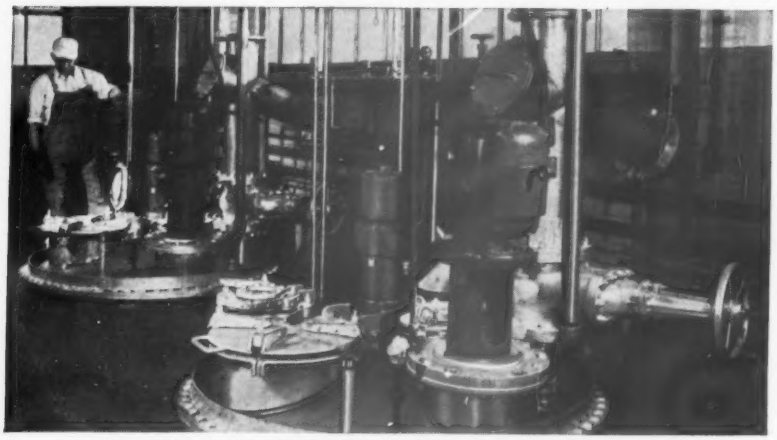
Michael D. Vaccaro has been promoted to Eastern Sales Manager. He was formerly active in the Witco sales force in Pennsylvania, New Jersey, and New York. Mr. Vaccaro joined the firm in 1937.

John V. Roach has been promoted to superintendent of the firm's Chicago plant. He had been assistant superintendent since 1952. Mr. Roach joined Witco in 1948 as chemical engineer. Prior to that time he was affiliated with the Grasselli Chemicals Division E. I. du Pont de Nemours & Co., Cleveland, Ohio.

METALS DISINTEGRATING

Harold E. Collins has been named vice-president of the company. He will handle the firm's marketing operations in its Pigments and Abrasives Divisions. Mr. Collins was formerly sales manager of the Pigments Division. He is a graduate of the Massachusetts Institute of Technology and has been associated with Metals Disintegrating since it acquired the Harrison Abrasive Division in 1946, at which time he was its Chicago Representative.

H. E. Collins



The varnishes made in this plant are noted for their even-drying, high gloss, durability. The manufacturer states that the uniformity and high solvency of Sun Spirits are important contributing factors. He has used this "Job Proved" product more than 22 years and has never had a complaint.

WHY SO MANY PAINT MAKERS LIKE TO USE SUN SPIRITS

Sun Spirits is a carefully balanced product. It has good wetting-out power. Volatility is controlled to insure a rate of drying neither too fast nor too slow. Purity is checked and rechecked to make certain of a reliable, high-quality product.

In new formulas as well as old, and in experimenting with new materials, you can rely on the uniformity and quality of Sun Spirits. For more information, or the counsel of an experienced representative, just call your nearest Sun Office.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO & MONTREAL

SUNOCO

ATLAS POWDER

Howard W. Dellard has been named to head the firm's Chicago District Sales Office. He succeeds **Harry B. Paul,** who has been transferred to direct Wilmington, Del., Chemical District Sales. Prior to his promotion, Mr. Dellard was technical sales representative in the Chicago area. He joined Atlas Powder.

William H. Erwin has been appointed International Division Director of Atlas' Industrial Chemicals Department. He will be responsible for development of chemical sales and operations outside the United States. Mr. Erwin previously headed chemical sales in the company's Wilmington district.

NATIONAL LEAD

Alex Stewart has been named vice-president, director and general manager of National Lead Company of Ohio, contract-operator of the Atomic Energy Commission plant in Fernald, Ohio. He continues as director of research.

Philip C. Muccilli, production manager, has been appointed chairman of the company Manufacturing Committee. **John F. Harper** has been named a member of the committee. Mr. Muccilli joined National Lead in 1920. In 1949, he was appointed assistant production manager, and this year was named production manager. Mr. Harper joined the firm in 1944. He has been secretary of the manufacturing committee since 1948.

A. M. Neumann has been named chief engineer of the Evans Lead Division of National Lead Company, succeeding **William F. Schadel,** who retired recently after 25 years of company service. Mr. Neumann joined the company in 1948. Mr. Schadel joined Evans Lead in 1929 as chief engineer.

BETTER FINISHES

Donald F. Garrigan has been named sales representative for the New York Metropolitan area. Previously, he was with C. J. Nickolas Co., Bellewood, Ill., as a technical representative in the finishing field. Since joining Better Finishes & Coatings, Inc. early this year, Mr. Garrigan has been employed in the laboratory on formulation, testing and application work.

D. F. Garrigan

EMERY INDUSTRIES

Alexander Moore has been named to the Development and Service Department. He will aid in both the development of new products and technical service on Emery's complete line of fatty acids and plasticizers. Mr. Moore graduated from Harvard University where he majored in Economics and Chemistry. He joined Emery four years ago, serving in various technical capacities in both production and application research.

A. Moore

ALLIED CHEMICAL

W. W. Knight, Jr., has been appointed Vice President of the Barrett Division, in charge of the industrial resin program. For the past seven years, Mr. Knight has held executive positions with the Libbey-Owens-Ford Glass Company of Toledo, O. Previously, he was with the Michigan Alkali Company for 11 years.

ALKYDOL..

is a well established and long respected name in research and development of

SYNTHETIC RESINS

ALKYD
MALEIC
PHENOLIC
EPOXY
VARNISHES
DISPERSIONS

We invite you . . .

to accept our wholehearted cooperation, long experience and quality formulations as an aid to improving your products.

ALKYDOL *Laboratories, Inc.*

3230 South 50th Avenue, Cicero 50, Illinois

GLIDDEN

NELIO GUM ROSIN

"The Standard Rosin of the World"

7 UNBEATABLE POINTS OF SUPERIORITY . . .

1. Uniform
2. Brilliant and Clean
3. Exclusive Vacuum Process
4. Highly Controlled
5. Low Fatty Acid Content
6. Highly Maleic Reactive
7. Free from Residual Turpentine

This specification rosin assures you the best, most dependable results and frees you from the troubles arising from use of ordinary gum rosins.

Shipped in standard non-absorbent, leakproof metal drums, 100 lb. net weight paper bags or fluid in insulated tank cars. Grades WW through H. Write for samples and prices.

THE GLIDDEN COMPANY - NAVAL STORES DIVISION

E. W. COLLEDGE

GENERAL SALES AGENT, INC., JACKSONVILLE 1, FLA.

New York
52 Vanderbilt Ave

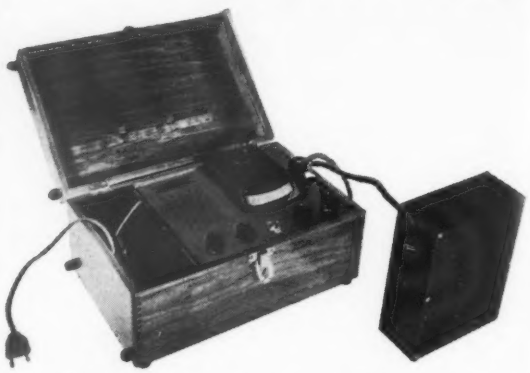
Chicago
25 E. Jackson Blvd.

Cleveland
2775 South Moreland Blvd., At Shaker Square

San Francisco
503 Market Street

PHOTOVOLT

Photoelectric GLOSSMETER



For reliable gloss measurements according to ASTM D523-49T on paints, varnishes, and lacquers.

Also for

- Tristimulus Colorimetry with 3 Filters
- Sheen Measurements at 85 Degree Incidence
- Dry Hiding Power and Infra-Red Reflectance

in accordance with Federal Specifications TT-P-141b

Portable, rugged, simple to operate

Write for Bulletin #677 to

PHOTOVOLT CORP.

95 Madison Ave. New York 16, N. Y

Odorless in the can . . . odorless on the wall . . . thanks to PAINTODORS, product of

SINDAR® Corporation
Industrial Aromatics and Chemicals

330 West 42nd St., New York 36, N. Y.
Branches: Philadelphia • Boston • Cincinnati
Detroit • Chicago • Seattle • Los Angeles • Toronto

Technical Bulletin available on request

Kentucky Colors

(Inorganic & Organic)

FOR

Quality Paints

Shawnee DRY COLORS

- BRILLIANT
- EASY GRINDING
- HIGH STRENGTH
- PERMANENT

Kentucky Color

AND CHEMICAL COMPANY, INC.

General Office and Works
LOUISVILLE, KENTUCKY

Offices and Agents in Principal Cities

Q What's the picture on availability of Safflower Oil for next year?

A GOOD! THE NEW CROP IS THE BIGGEST IN HISTORY—600% MORE THAN IN 1950!

1950 ——→ 100%

1951 ——→ 133%

1952 ——→ 411%

1953 ——→ 600%

Q How can I be sure I can get enough Safflower oil to make plans for high-volume use?

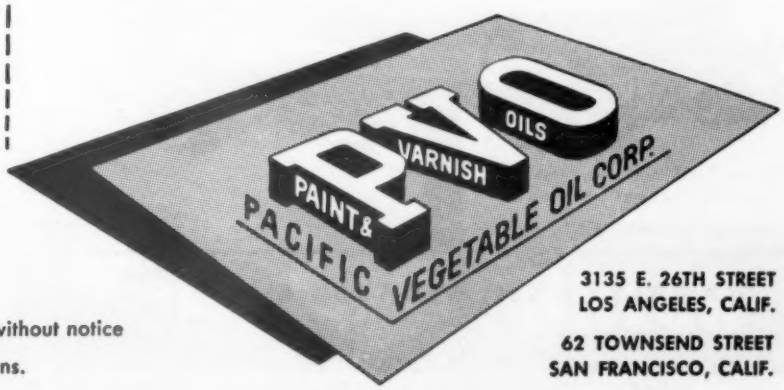
A PVO will give you a firm contract for future deliveries.

Q And the price?

A You can't lose! If you like, PVO will peg the price to rise and fall with soybean or linseed oils.* Ask your PVO representative.

Q What's all this about the NEW conjugated Safflower 22. What benefits can it give me?

A Plenty. Better write for samples and specifications.



3135 E. 26TH STREET
LOS ANGELES, CALIF.

62 TOWNSEND STREET
SAN FRANCISCO, CALIF.

*This offer subject to withdrawal without notice depending on market conditions.

WAGENMAN PAINT

James P. Walsh has been named technical director. He will supervise product development for the expanding Industrial Product Finishes Division and supervise development and quality control of all Wagenman products. Mr. Walsh was formerly associated with the Denton Climo Co., where he was technical director for three years. Previously he was with the Interchemical Corporation for 15 years.

J. P. Walsh

SELAS CORPORATION

Thurman G. Thurston has been named representative of the Selas Corporation of America's Cleveland, Ohio, territory. Prior to his Selas appointment, he served as a development and sales engineer for Bryant Industrial Division. A native of Cleveland, educated at Case Institute of Technology, Mr. Thurston served with the U. S. Army Signal Corps in the South Pacific during World War II.

T. G. Thurston

J. W. Moore

J. H. Daniels

D. A. Copenhaver

A-D-M

James W. Moore has been named general sales manager, a newly created position. He joined the firm in 1928. Mr. Moore was made director of special oil sales in 1935, elected a vice president and director in 1946, and appointed to the ADM executive committee in 1949.

John H. Daniels has named director of linseed oil sales. He joined ADM in 1946, and was made assistant to Mr. Moore in 1951.

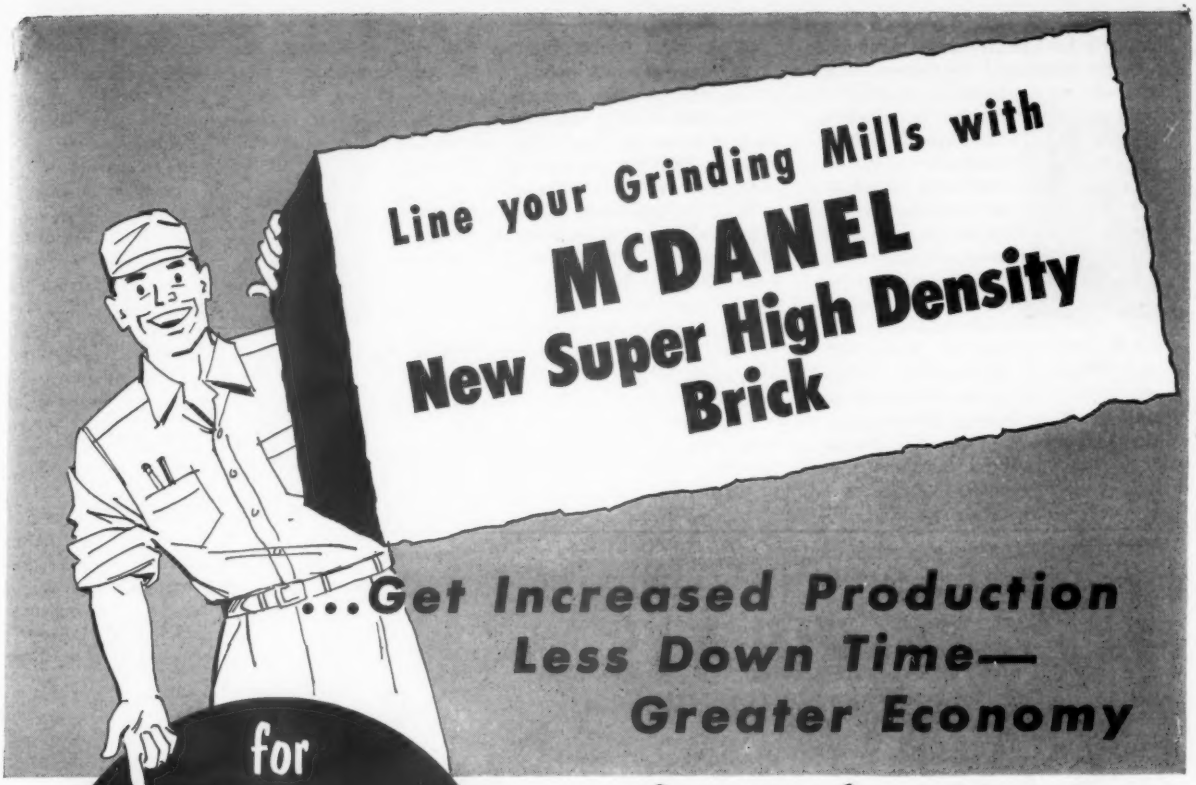
Daniel A. Copenhaver, former executive vice-president and general manager of Industrial Oil Products Corporation, Los Angeles, has joined the firm's sales force. Mr. Copenhaver helped found the Industrial Oils Product Corporation, Los Angeles, in 1944.

ARMOUR

John M. Hoerner has been appointed to the newly created post of Chemical Division director of purchases and sales. Mr. Hoerner will direct raw material purchases and the sale of chemical products including fatty acids and derivatives and industrial oils. He was previously associated with the Atlantic Refining Company for 22 years.

CABOT

Peter R. McClure has joined the staff of the company's Research and Technical Service Laboratories at Cambridge, Mass. He will be primarily engaged in the solution of specific customer technical problems. Since receiving hsi B.S. degree in Chemistry in 1944, Mr. McClure has been engaged in the plastics industry, with particular emphasis on vinyl compounding and processing. He is a member of the Society of Plastics Engineers and Society of Plastics Industry.



for Hard—Tough Grinding

Less Wear and Contamination

Of course McDanel new High Density Hand Rolled Super Grinding Balls were used in the test run, thus assuring faster grinding, longer wear, plus greater economy of operation than you have ever known.

Here's the Proof:

In a test run over a period of one year in a 42 x 48 Ball Mill McDanel new Super High Density Brick showed two and a half times greater wearing quality than the regular Porcelain lining brick. Revolutionary? Yes, but true.

Here is a picture of a McDanel new Super High Density Brick taken from the mill at the end of the test run. Thickness of brick left 1 1/16".

Here is a picture of a regular Porcelain lining brick at the end of the same test run. Thickness of brick left ½".

Write for the McDanel Porcelain Products Catalog

McDANEL BRICK

McDANEL REFRACTORY PORCELAIN COMPANY, BEAVER FALLS, PENNSYLVANIA

R-B-H

Richard L. Lynch, sales manager, has been designated divisional vice president of the firm's Dispersions Division of Interchemical Corporation. He joined R-B-H as a sales representative in 1939 after six years with the Philco Corporation in its finishes and adhesives division. Mr. Lynch represented R-B-H in the Metropolitan New York, New Jersey, Philadelphia, Baltimore and up-state New York before being appointed sales manager in 1951.

R. L. Lynch

RINSHED-MASON

G. A. Hall has been named West Coast district sales manager of the firm's Refining Division with offices in Glendale, Calif. His territory comprises California, Washington, Oregon, Western Montana, Utah, Nevada, Arizona, Hawaii and Mexico.

W. N. McGillevry has been appointed District sales manager of the Midwest area for the Refining Division, with offices in Ingleside, Ill. He will cover Colorado, Eastern Montana, North Dakota, South Dakota, Iowa, Kansas, Nebraska, Missouri, Illinois, Minnesota, Wisconsin, Oklahoma and Western Arkansas.

A. J. Oliver has been named district sales manager for the Eastern Region for the Refining Division with offices in Verona, N. J.

MARBON CORP.

Robert Shattuck has been promoted to the presidency of the Marbon Corporation a subsidiary of Borg-Warner. He was previously vice president and general manager of Marbon. As president, Mr. Shattuck succeeds George P. F. Smith who retired to devote full time to his duties as president of the Norge Division of Borg-Warner. Mr. Shattuck joined Marbon in 1942 as assistant general manager and was named vice president and general manager in 1944.

Robert Shattuck

H. Hunter Gehlback, assistant secretary and assistant general counsel of Borg-Warner has been elected secretary. **E. F. Meyer,** previously chief accountant, has been named treasurer and assistant secretary, and **DeMorris Pratt** has been reelected vice president and sales manager.

McDOUGALL-BUTLER

Louis S. Isbell has been named district sales manager for Northern New England. For the past 14 years, he has served as manager of the Auburn-Maine Division, which combined a retail store and warehouse. However, McDougall-Butler will now devote all of its facilities in New England to warehouse accomodations.

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- **Sagging** of enamels.
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REACTION OF STYRENE

(*From page 35*)

above, 2.4% of water was found to be an optimum quantity for similar concentrations of soap.

Acknowledgment

The author wishes to express his thanks to the management of Lewis Berger (Great Britain) Ltd. for sponsoring this work.

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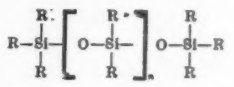
Polyethylene-Silicone Coating

U. S. Patent 2,655,489. William Dent Lawson, Springfield, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del., a corporation of Delaware.

The process of increasing the gloss of abrasion resistant enamels and lacquers containing polymerized ethylene which comprises preparing a gel containing 5% to 50% of polymerized ethylene based on the weight of the gel, .025% to 2.0% of a liquid alkyl polysiloxane based on the weight of the polymerized ethylene, and a solvent for the polymerized ethylene and polysiloxane, grinding said gel with pigment, non-volatile resinous organic polymeric film forming material, and volatile solvent until a uniform dispersion is obtained, and mixing the resulting dispersion with additional non-volatile resinous organic polymeric fim forming material and additional solvent; said polysiloxane being represented by the structural formula in



which the various "R's" represent monovalent alkyl hydrocarbon radicals and "*n*" is a whole number greater than one; and said polymerized ethylene being solid at room temperature, having a structural formula characterized by recurrent —CH_2— groups, and showing a crystalline structure by X-ray diffraction.

Coating Compositions

U. S. Patent 2,650,909. Carl L. Betsch and Fred H. Detrick, Philadelphia, Pa.

A liquid coating composition for application to the surfaces of plastic materials, said composition being characterized by the fact that it becomes bonded to plastic materials without heat and pressure and is resistant to molding treatment, including heat, said composition comprising the following materials in substantially the proportions indicated: 20 pounds pigment, 2½ fluid ounces wetting agent, 3½ to 6 gallons acrylic resin, 50 fluid ounces dibutyl oxalate and 80 fluid ounces to 1 gallon butyl lactate, said resin being selected from the group consisting of polymerized methylacrylate and polymethyl-methacrylate.

Pigment Paste

U. S. Patent 2,656,327. Alfred E. Van Wirt and George F. Jones, Glens Falls, N. Y. assignors to Imperial Paper and Color Corporation, a corporation of New York.

A pigmented coating composition comprising an aqueous continual external phase, a dispersed pigment, a thickener, a cationic water soluble resin which is produced by reacting 1 mol of urea with from 2 to 3 mols of formaldehyde in the presence of at least one-third mol of a compound selected from the group consisting of pyridine, quinoline, water soluble aliphatic amines having at least one hydrogen attached to the amino nitrogen and hydroxy tertiary aliphatic amines, until a solution is obtained and then acidifying the mixture to a pH between 0.5 and 2.0 and immediately neutralizing to a pH of from 6.0 to 7.0; and an anionic polymeric material of the group consisting of polystyrene polyvinyl chloride and polyvinyl acetate, said anionic resin being present in an amount varying from 5% to 15% by weight based on the weight of the composition, said cationic resin being present in an amount

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sufficiently great to redisperse the anionic resin, the cationic resin of said composition being convertible to an insoluble state by heat.

Luminescent Resins

U. S. Patent 2,654,732. Edward M. Geiser, Downers Grove, Ill., assignor to Universal Oil Products Company, Chicago, Ill., a corporation of Delaware.

A process for the production of a fluoroscent resinous material which comprises reacting an aryl-substituted alkyl halide with an alkenyl ether of a polyhydroxy organic compound in the presence of an aqueous alkaline medium at condensation reaction conditions.

Translucent Metallic Enamels

U. S. Patent 23,722. Ralph E. Pike, Flint, Mich., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del., a corporation of Delaware. Original No. 2,604,414, dated July 22, 1952.

A coating composition adapted to yield a tough, durable finish having a metallic appearance of great depth and brilliance comprising a vehicle and pigment, the said pigment consisting of a prime pigment selected from material of the group consisting of colloidal hydrous iron oxide and chromium tetrahydroxide; B *transparent* pigment substantially complementary in color to the said prime pigment in amount to yield a gray when mixed separately therewith; C at least one colored tinting pigment and D finely divided flake aluminum metal.

Synthetic Resin

U. S. Patent 2,656,335. Herman S. Bloch, Chicago, Ill., assignor to Universal Oil Products Company, Chicago, Ill., a corporation of Delaware.

A process for producing a synthetic resin which comprises reacting a carbonyl compound selected from the group consisting of aldehydes and ketones with the condensation product of from about 5 to about 25 mols of a phenol having at least two nuclear hydrogen atoms, from about 25 to about 45 mols of an aromatic hydrocarbon having at least two nuclear hydrogen atoms and an alkyl group of not more than two carbon atoms, and from about 50 to about 75 mols of a conjugated aliphatic diene hydrocarbon.

Alkyl Titanates

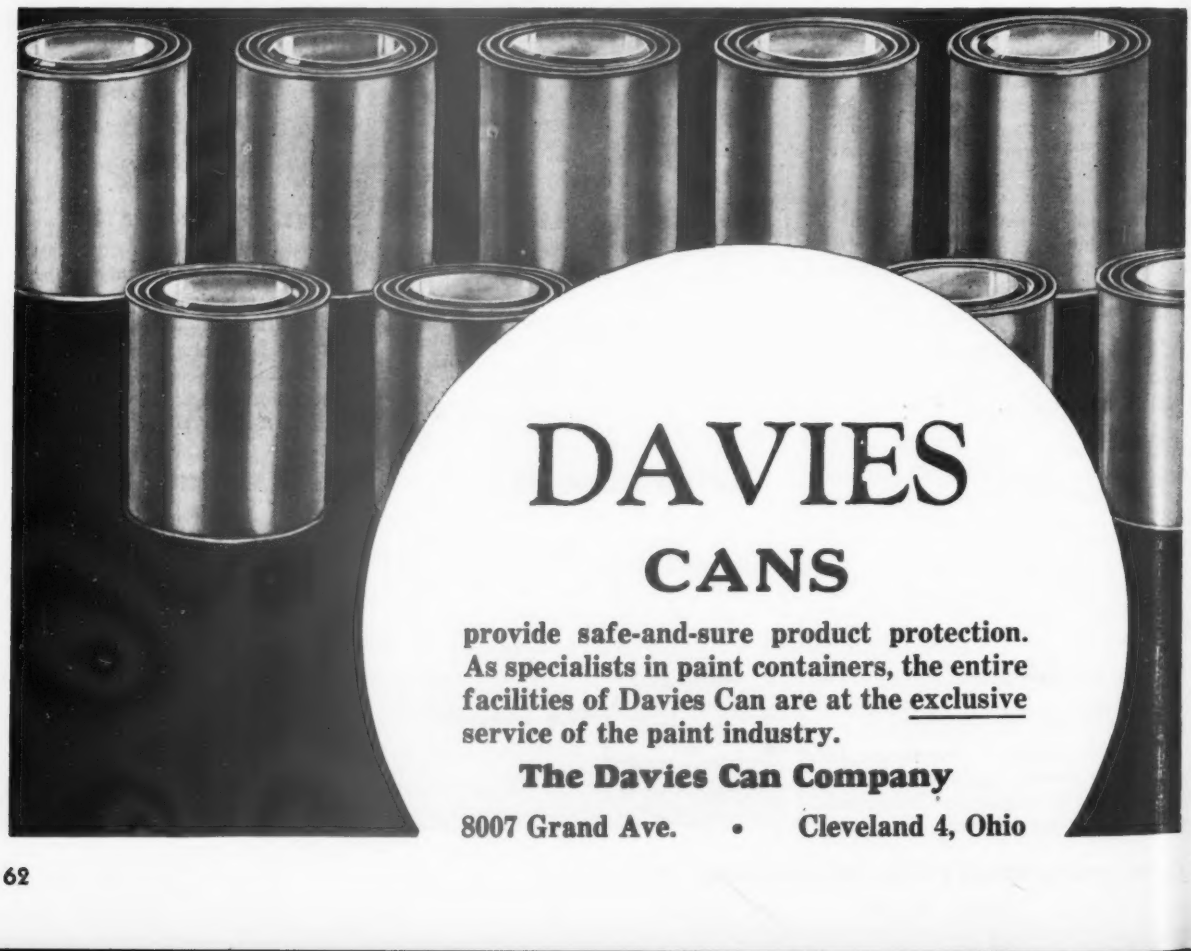
U. S. Patent 2,655,523. Daniel F. Herman, Queens, N. Y., assignor to National Lead Company, New York, N. Y., a corporation of New Jersey.

Method for preparation of alkyl titanates which comprises admixing titanium tetrachloride, an alcohol selected from the group consisting of primary and secondary monohydric non-substituted aliphatic alcohols having at least two carbon atoms, and liquefied ammonia in a closed system said ammonia being present in amount at least equal to that required to react with the chloride ions released from the tetrachloride plus that required to dissolve the ammonium chloride formed by the reaction, and separating the liquid alkyl titanate layer from the liquid ammonia-ammonium chloride layer, the entire process being carried out in the anhydrous state.

Corrosion-Resistant Paint

U. S. Patent 2.657,145. Arthur Arent, Fort Dodge, Iowa, assignor to Arthur Arent Laboratories Inc., Des Moines, Iowa, a corporation of Iowa.

The method of forming an improved corrosion-resistant paint which comprises mixing turpentine and anhydrous antimony chloride, with the amount of antimony chloride being from 30% to about 50% by weight of the mixture, until an oily material containing an antimony compound is formed, adding water to the oily material containing said antimony compound, thereby forming a water-insoluble, colloid-like dispersion of an antimony compound in the oily material, and adding a neutralizing agent to the dispersion in order to neutralize any free acid.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Styrene Copolymer

U. S. Patent 2,650,907. James H. Sample, Chicago, Ill., assignor to The Sherwin-Williams Company, Cleveland, Ohio, a corporation of Ohio

A fast drying, mineral spirit resistant copolymer produced by co-polymerizing a vinyl aromatic compound and a non-conjugated unsaturated oil which has been partially polymerized by blowing with a free oxygen-containing gas and which is selected from the group consisting of drying oils and semi-drying oils at a temperature of from about 225° F. to about 500° F. in the presence of from 0.02% to about 1% by weight of the oil of a heavy metal drier soluble in the oil and from 0.5% to about 2.0% by weight of the oil of a metal-free peroxide, in which copolymer the ratio of vinyl aromatic compound to oil is in the range of from 60:40 to 25:75.

Ester Resins

U. S. Patent 2,653,142. William P. Cody, Lombard, and Edgar L. Clark, Cicero, Ill., assignors to Alkydol Laboratories, Inc., Cicero, Ill., a corporation of Illinois.

Ester resins suitable for oleoresinous varnish and printing ink formulations which are esters of natural resins of at least 75 acid value with a member of the group consisting of the monomeric monohydric phenolic ethers of aliphatic polyhydric alcohols and their epoxides.

Tetrahydrophthalic Alkyd Resins

U. S. Patent 2,655,486. Alexander C. Keyl, Bensenville, and Robert H. Geils, Downers Grove, Ill., assignors to Fred'k A. Stresen-Reuter, Inc., a corporation of Illinois.

The method of forming an alkyd resin comprising simultaneously esterifying and condensing an intermediate product, comprising a monomeric tetrahydrophthalic acid half ester of a monoester of a 10 to 22 carbon atom fatty acid with a polyhydric aliphatic alcohol having at least three hydroxyl groups, with an esterifying agent selected from the group consisting of a 10 to 22 carbon atom fatty acid, a natural resin acid and hydrogenation products thereof, a polycarboxylic organic acid and anhydrides thereof and polyhydric aliphatic alcohols.

Synthetic Drying Oil

U. S. Patent 2,652,342. Anthony H. Gleason, Westfield, N. J., assignor to Standard Oil Development Company, a corporation of Delaware.

An enamel base comprising an oily sodium copolymer of 75 to 85 parts of butadiene-1,3, 25 to 15 parts of styrene and 0.05 to 0.5 part of maleic anhydride combined therewith, said copolymer having an intrinsic viscosity between about 0.15 and 0.30.

Plasticized Vinyl Chloride

U. S. Patent 2,653,948. Joachim Dazzi, Dayton, Ohio, assignor to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A resinous composition comprising a vinyl chloride polymer plastized with an adduct of one mole of an ester selected from the class consisting of dialkyl and bis (alkoxyalkyl) esters of a dimeric, unsaturated vegetable oil fatty acid in which each alkyl and each alkoxyalkyl radical has from 1 to 8 carbon atoms and from 1 to 4 moles of a fumarate selected from the class consisting of dialkyl and bis (alkoxyalkyl) fumarates in which each alkyl radical and each alkoxyalkyl radical has from 1 to 8 carbon atoms.

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Merchandising Meeting Held by Morris Paint & Varnish Company

Movies on peeling paints and wallpaper were featured at an all day merchandising meeting held recently by the Morris Paint & Varnish Company, Omaha, Neb., at the Castle Hotel, Omaha.

Three hundred dealers and advertising and promotion representatives attented the meeting, which also featured round-table discussion, headed by advertising and promotion representatives of radio, television, and newspapers.

Claus Maizner, purchasing agent, Morris Paint, demonstrated new paints, color viewers, new tools, etc.

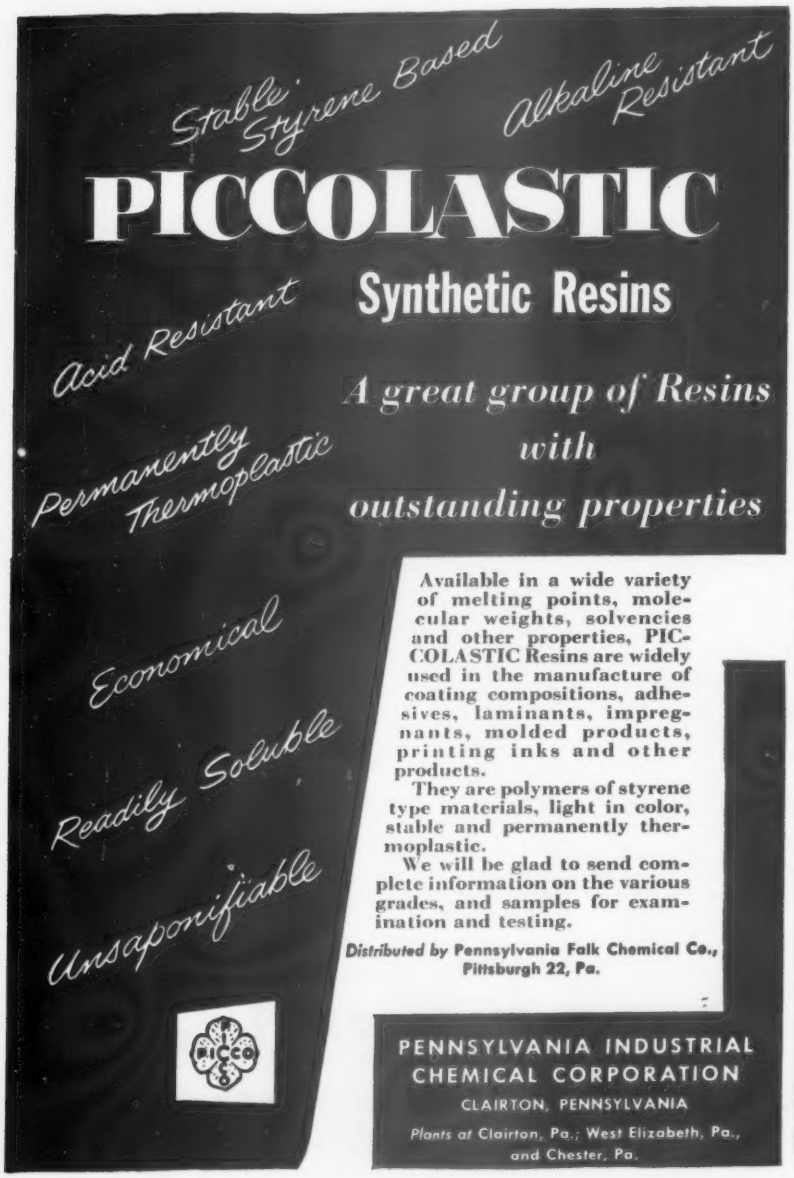
Also covered at the meeting was Archer-Daniels Midland Company's "Week-End Decorator" promotion plan to increase sale of household paints.

Alfred Sophir, Manager of Morris Paint Co., Omaha, Neb., conducted the meeting. He was assisted by George N. Clayton, head chemist.

Philadelphia and National Paint Assns.' Make Comm. Appointments

J. W. Gardiner, Jr., manager, Pigment Division of the Philadelphia Branch of the National Lead Company, New York, N. Y., has been made a life member of the Executive Committee of the Philadelphia Paint, Varnish and Lacquer Association. He served as chairman of the committee for five years.

Another National Lead executive, David A. Merson, vice president and director, has been elected to the NPVLA executive committee.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QUALITY CONTROL

(*From page 32*)

bringing the process into control before proceeding with questions two and three.[8]

(2) Is the quality average within specification? If the quality average is too high or too low it may be shifted by changing the process controls. Sometimes it is not known how to do this. In such cases, this should be assigned as a problem to development or process improvement groups.

(3) Is the range of variation within specification? If the control limits for individual values lie within the specification, then the process may be judged satisfactory. If the variation is too great, then an investigation should be conducted to narrow the limits on raw material specifications, process control, or methods of tests.[9] This may require assistance from development and research groups.

One of the most important factors to be considered in the application of specifications to chemical products is the precision of the chemical tests and sampling used to measure quality. Unless the accuracy of each test method is comparable to the requirements of the process and the specification, then difficulties and confusion will result. Under these conditions it is sometimes possible to substitute tests or, perhaps, to measure another factor which correlates with the property in question. The control chart and the correlation tests are excellent methods of doing this.[10]

The chemical specification can be one of the most important methods used by the chemical engineer in process control. It must, however, be used with and understanding of the factors in the chemical process and statistical nature of materials and forces.

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New Book

Drying Oil Technology

An Introduction to Drying Oil Technology by M. R. Mills, Technical Director, Norman, Smee K Dodwell, Ltd. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York, N. Y. 238 pages. Price $6.50.

This book covers many aspects of drying oil technology and is written by a man who has considerable practical experience in this particular field. Of the 38 figures and diagrams presented, most of them are concerned with production set-ups. Similarly all tabulations which are presented deal, for the most part, with quality control and production data. Complete references on all the subjects treated are given, and these are helpful in locating further information on any of material discussed in this work

The author does not go into details on the chemical reaction of the various processes presented, but details concerning the practical aspects involved in these processes will serve as a useful guide to the engineer. *Reviewed by Dr. Max Kronstein, College of Engineering, New York University, New York.*

•

Binney & Smith Company Moves To New Quarters in New York City

The Binney & Smith Company, formerly of 41 East 42nd St., New York 17, N. Y., has moved to new quarters at 380 Madison Ave., New York 17.

The firm's telephone and teletype numbers remain the same.

•

Stresen-Reuter Names Rice & Co. Representative in Pa. and Ohio

Fred'k A. Stresen-Reuter, Inc., Chicago, has appointed Rice and Company, Cleveland, Ohio, as their vehicle and drier representative in western Pennsylvania and most of Ohio.

Until now, Rice and Company has only represented Stresen-Reuter's line of driers.

•

Dayton Oil Company Appoints Chemical Specialties Manager

The Dayton Oil Company, Dayton, Ohio, has appointed Daniel D. Downes New York branch manager of its Chemical Specialties.

Mr. Downes, who has had 30 years of experience in the chemical field, will handle Dayton's complete line of coating products.

He will be located in New York City.

Fischer & Porter Co. Forms Special Products Division

Creation of a Special Products Division for development of special instruments and instrument components to contract specifications has been announced by Fischer & Porter Company, Hatboro, Pa.

Edward H. Muhleisen, who has served both as field engineer and application engineer for Fischer & Porter, has been appointed manager of the new Division.

Special projects will be handled to develop instrumentation for difficult applications relating to point-of-measurement or remote indication, recording, and/or control of such variables as flow, pressure, temperature, level, specific gravity, viscosity, consistency, and others.

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THEN TURN TO PAGE 63

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TECHNICAL Bulletins

VINYL ACETATE EMULSIONS

Six page pamplet entitled, "Suggested Formulations Based on Vinac Polyvinyl Acetate Emulsions has been recently issued by the Colton Chemical Co., 1545 E. 18th St., Cleveland 14, Ohio. Formulations for primer-sealers, interior and exterior paints together with manufacturing procedures are covered in detail in this pamphlet.

ACRYLIC EMULSION

Catalog listing new formulations for its Rhoplex AC-33 acrylic resin emulsion for water paints has been released by the Rohm & Haas Company, Washington Square, Philadelphia 5, Pa.

The publication, consisting of 17, 3-ringed sheets, contains information on the properties of Rhoplex AC-33 and advantages to the paint manufacturer and paint user.

Detailed information on the mechanical, chemical and storage characteristics of the product are outlined in the catalog, along with charts and tables on the use of this emulsion in various type water paints.

ALKYD REDUCTION

A four-page folder has been published by the Shell Oil Company, New York, N. Y., on its new alkyd reduction technique.

The technique was formulated to overcome the important problem of producing a thinner whose solvency for alkyd resins is equivelant to that of mineral spirits.

Briefly, the Shell alkyd reduction technique consists of the use of an additive which behaves as part of the vehicle solids and which "marries" these otherwise incompatible alkyds to Shell's Sol 72. According to firm, desired solids content can be achieved at reasonable viscosities and with freedom from stability worries. Moreover, Shell says, no sacrifice in holdout, adhesion, durability or brushability is entailed.

The technique is the subject of a pending U. S. patent application.

VINYLTOLUENE

Availability of a technical data bulletin on Dow Chemical's new monomer vinyltoluene for use in paints and varnishes has been announced by the company.

The 47-page booklet, illustrated with many charts and graphs, is organized in three sections representing the fields of use of vinyltoluene in the paint vehicle industry.

Technical information and data concerning oils are contained in the first section. This includes data on vinyltoluene's reactivity with all commercially important vehicle oils and solubility of the products in aliphatic hydrocarbons. Another section introduces and describes a completely new class of vehicles which are interpolymers of vinyltoluene and drying oils with divinyl-benzene. Part three displays the utility of the new monomer to enhance alkyd resins.

Bulletin is available without cost from the Coatings Technical Service, Dow Chemical Company, Midland, Mich.

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EPON RESINS

Bulletins on recommendations for the handling of Epon resins and their formulations, and epon ester YS-5, have been issued by the Shell Chemical Corp., 500 Fifth Ave., New York 36, N. Y.

Bulletin on handling Eponr esins includes sections on curing agents and suggested industrial hygiene practices. The latter covers personal hygiene, protective devices, handling procedures, remedial measures, and fire control.

Bulletin on Epon Ester YS-5 contains information on formulation, typical constants, descriptions and uses of product, drying data and reduction viscosity.

NATURAL GUM

Bulletin giving up-to-date information about the importation, processing and usage of natural Gum Karaya is available from Morningstar, Nicol, Inc., Natural Gum Dept., 630 West 51st. St., New York 19, N. Y.

Well illustrated, the publication also compares viscosity measurements of the product with other water soluble gums and a brief section deals with the theoretical structure of gels.

Eight page bulletin is punched for 3-ring binders as a permanent reference booklet for complete information about the forms in which Gum Karaya is available.

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CALENDAR OF EVENTS

Jan. 25-28, 1954. Plant Maintenance and Engineering Show, International Amphitheatre, Chicago, Ill.

Jan. 26-28. 1954. 27th Annual Industry Convention of Soap & Glycerine Producers, Inc., Waldorf-Astoria Hotel, New York City.

Feb. 25-26, 1954. Conference of the Protective Coatings Div., Chemical Institute of Canada, Toronto and Montreal, Canada.

Mar. 3-5, 1954. 18th Annual Convention of the Southern Paint and Varnish Production Club, Buena Vista Hotel, Biloxi, Miss.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmillers.
Indianapolis — Sept., Claypoll Hotel.
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Buildng.

Golden Gate, Last Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Seven Seas Restaurant.

Kansas City, 2nd Wednesday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, Puritan Hotel, Boston.

New York, 1st Thursday, Bra's Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

St. Louis, 3rd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday, 40-8 Club, Buffalo.

SILICONE PRODUCTS

1953-1954 reference guide to Dow Corning silicone products has just been published by the company.

The products are described largely in terms of operating and service characteristics. According to firm, this year's guide is the most thorough and comprehensive listing of silicone products ever published. Fifteen new products ranging from adhesives to molding compounds have been added.

The applications for silicone fluid are detailed, and the performance of Silastic as a dielectric is also described.

For copy of catalog write Dow Corning Corp., Midland, Mich.

SYNTHETIC CHEMICALS

1954 edition of the booklet, "Physical Properties of Synthetic Organic Chemicals," has just been issued by Carbide and Carbon Chemicals Co., a division of Union Carbide and Carbon Corporation, 30 East 42nd St., New York 17, N. Y.

The twenty-page booklet presents data on more than 330 products and features 36 new chemicals. For easy reference, the chemicals are arranged by family groups. Condensed data on applications are presented and physical properties are given in tabular form.

Ask for the "P.P.S.O.C." Booklet F-6136.

CONTAINER DIRECTORY

A 1953-1954 directory of steel shipping container manufacturers, covering by volume 95 percent of total industry production, has just been published by the Steel Shipping Container Institute, 600 Fifth Ave., New York 20, N. Y.

Publication contains tables which provide quick product-manufacturer cross-reference and addresses of manufacturers' plants and offices. Among the data presented are statistics on annual production of various container types and their uses by industries, historical material, general information on container specifications, and recent developments in exterior and interior container coating research.

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Write for technical data, samples, or the assistance of an expert Cyanamid representative.

AMERICAN Cyanamid COMPANY

PLASTICS AND RESINS DIVISION
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HYDRITE FLAT

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HYDRITE FLAT